



Scanning - Shortwave - Ham Radio
Equipment - Computers - Antique Radio

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Digital Modes and Television

TV DXing___ HD Radio___ HDTV___ Equipment Reviews



Also in this issue:

DXing Venezuela on AM

Eton's S350DL AM/FM/SW Portable

AOR, the Authority on Radio Makes MORE Than Great Radios!

Discover these Accessories & Add to your Capabilities.



DA3000

Antennas for the Great Outdoors

DA3000: a 16 element receive wideband discone antenna with useable frequency coverage from 25MHz to 2GHz. Using different length elements to ensure true wideband characteristics, the DA3000 also includes one 'loaded' element to enhance low frequency performance. Engineered and manufactured to AOR's exacting standards, the DA3000 comes with 50 feet of quality RG58/U coaxial cable terminated in a BNC plug for the radio connection and a low-loss TNC plug in the antenna base. Pole clamps are also standard.

Designed for areas where space is a problem or when an "unobtrusive" installation is essential, **SA7000** is a super wideband coverage receive antenna with useable frequency coverage of 30 KHz to 2 GHz. The SA7000 is a passive arrangement with two whip elements: a long element for short wave up to 30 MHz and a second shorter loaded whip antenna for frequencies up to 2 GHz. The loading coils are tuned around 150 & 800 MHz to enhance VHF & UHF performance.



SA7000

Antennas for Indoor Enjoyment

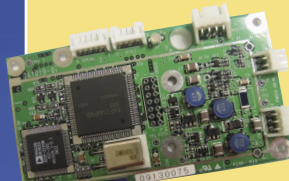
AOR has made performance even better with the new **LA380** indoor antenna as successor to the popular LA350. The LA380 features full frequency coverage (40KHz - 500MHz) using a single receiving element. Designed to provide reception when away from the main monitoring location or when large external antennas are not practical, the LA380 is a compact active (1 foot diameter) loop antenna which features an

internal high-gain amplifier (20dB for 40KHz-250MHz) and excellent overall strong signal handling (high IP3 +10dBm). The loop design allows directional control and nulling noise or interference. Perfect for listening in remote locations or in antenna-restricted areas.



LA380

Accessories for Added Monitoring Capability



P25-8600
APC025 Decoder

Now you can monitor APCO 25 signals using an AR8600MKII. The **P25-8600 APC025 Decoder** can be installed in the AR8600MKII receiver to automatically decode the APCO25 signal. The decoded audio is then output from the receiver's speaker. (Installation is required.)

The **TV5000A NTSC TV Internal Converter** adds the ability to receive broadcast television signals (NTSC) and allow monitoring video feeds from a variety of sources including broadcast TV channels, public safety agencies, aircraft, Amateur Radio FSTV, news media video and more when used with AOR AR5000A series of communications receivers.



TV5000A NTSC
TV Internal
Converter

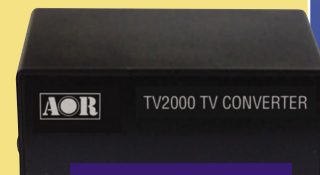


TVA-1 External
NTSC TV Converter

The **TVA-1 External NTSC TV Converter** is compact, lightweight and easy to install. Designed to be used with the AOR AR5000A series of communications receivers, its simple operation uses the 10.7 MHz IF input from your

receiver. Audio and video outputs allow monitoring a variety of sources such as broadcast TV, public safety agencies, aircraft, Amateur Radio FSTV, news media video and more.

The **TV2000 External NTSC Video Decoder** is designed to be used with the AOR SR2000. Compact and lightweight, no external power supply is required (power is supplied from the SR2000). The video output is available from the rear panel of the TV2000 and audio is provided from the SR2000 through the external speaker jack.



TV2000 External
NTSC Video Decoder



Authority on Radio
Communications

AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com <http://www.aorusa.com>

Specifications are subject to change without notice or obligation

For more great
accessories, visit
the website at
www.aorusa.com.

Your 5 star receiver search is over! Look no further than WiNRADiO.

- Software-defined DSP demodulation
- Excellent sensitivity
- High dynamic range
- Continuously adjustable IF bandwidth
- Optional DRM demodulator
- Real-time spectrum analyzer
- Graphical IF shift, passband tuning and notch filter
- User definable audio filter
- Noise blanker
- Audio and IF recording and playback
- Test and measurement facilities



WiNRADiO G313 Series Software Panel

WiNRADiO G313 series

External or internal? With the WiNRADiO WR-G313 series the choice is yours. There is the PCI-based internal G313i (fits neatly inside your PC, no power supply necessary, no cables, no clutter on your desk). And there is also the USB-interfaced G313e which can work very well with your laptop if portability is important to you. Both are very high-performance software-defined HF receiver models, 9 kHz to 30 MHz, optionally extendable to 180 MHz.

The G313 software contains numerous advanced features, many tuning and scanning options, virtually unlimited memories and a rich on-line help facility.

With so many advanced features at a great price, and our large range of software and hardware options, the G313 series models will surely continue to impress.

If you're looking for a receiver with sophisticated, easy to use software displays, and *"an outstanding combination of performance, functionality, quality and value for money"** then look no further than the versatile and technically capable G313 WiNRADiO receivers.

* WRTH review of G313i



WR-G313e (external)



WR-G313i (internal)

Reviews

"Overall, the G313 remains, in both its forms, my receiver of choice when trying to extract weak signals out of noise and interference. The Synchronous AM mode is particularly effective and the IF filters manage to cut a very sharp line between passband and stopband."

"Sensitivity and stability are also excellent."

Short Wave Magazine

"Of note is that the operating software is constantly being updated and is freely available from the WiNRADiO website, giving a considerable degree of 'future-proofing' to a purchased receiver..."

RadCom

"So what would I like to retain in my own radio room? The WiNRADiO G313e is a splendid receiver in all respects, and an excellent example of what can be achieved in a contemporary software-defined radio."

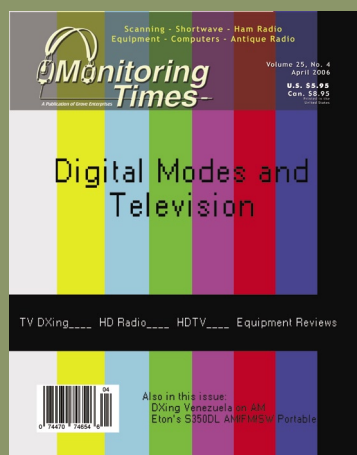
"All in all, the G313e is an excellent receiver for both conventional and DRM broadcast reception and will undoubtedly enhance WiNRADiO's reputation for quality and value for money."

"Overall rating: 5 stars" ★★★★★

World Radio TV Handbook 2006

For more information about the 5 star rated WiNRADiO G313 radio products and the extensive range of accessories and options available to choose from, please visit our website:

WiNRADiO®
www.winradio.com



Cover Story

Beginner's Guide to TV DXing

By Gayle Van Horn

In the DX hobby, there are those who chase distant signals on shortwave, on the mediumwave dial, on the very low frequencies, and even on VHF FM. But there's another group of DXers whose hobby is more about what you see than what you hear.

Remember over-the-air television? TV can be DXed just the same as an FM radio signal. Fortunately, just when the shortwave season winds down for the summer, E skip and tropospheric conditions become more conducive for receiving distant signals over your television – even using simple rabbit ears for an antenna. Story starts on page 10.

C O N T E N T S

Hi-Def Radio Fights Death Star 14

By Ken Reitz

One strategy AM and FM broadcasters are using to counter the competition of satellite radio is digital or "high definition" radio. How does it work and where do we stand in the transition? What do you need to tune in, what new equipment is available, and where can you get it? Progress has been slow, but answers are finally beginning to emerge. What we won't know for a long while yet is whether the mode will catch on and whether it will "save" the industry.

Venezuela - DXing the Land of Bolívar 16

By Bogdan Chiochui

In the northern hemisphere, the season from fall through spring favors AM reception, not only on shortwave but also on the mediumwave broadcast band. Under prime conditions, you never know when you might start hearing signals coming through from South America.

From his location near Montreal, Canada, the author has developed a fondness for chasing signals from Venezuela. In this article he shares with MT readers the "best bets" for logging the 12 easiest of Venezuela's 24 states. Give them a try before summer storms drown the band in static!

Digital TV - Truth & Myths 66

By Doug Smith

This month's cover feature is geared toward DXing analog television signals. But in 2009, analog TV will be gone. This special On the Bench technical article provides one of the clearest explanations we've yet seen of how digital television works. And yes, digital TV can also be DXed!

Reviews

A portable radio handy to keep around for AM DXing and as a back-up shortwave radio is the **Eton S350DL**. It has very nice sound and provides digital readout with analog tuning – the best of both worlds (see page 69).

The HD Radio field is so new, you may find it a little difficult to find digital equipment. In this issue we review the **Kenwood EZ500 Mobile HD Radio** and two antennas for picking up digi-

tal FM radio or television signals – the **Winegard HD6065P** yagi and the **Winegard Sharp-Shooter** (see page 70).

In our software review column, we conclude a review of SysLabs' RadioControl program with its powerful searches and database utilities, and the optional ability to control up to four receivers or transceivers (page 72).



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Address: 7540 Highway 64 West,
Brasstown, NC 28902-0098
Telephone: (828) 837-9200
Fax: (828) 837-2216 (24 hours)
Internet Address: www.grove-ent.com or
e-mail: mt@grove-ent.com
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Owners

Bob and Judy Grove
judy@grove-ent.com

Publisher

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor

Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor

Larry Van Horn, N5FPW

Art Director

Bill Grove

Advertising Svcs.

Beth Leinbach
(828) 389-4007
bethleinbach@monitoringtimes.com

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EDITORIAL STAFF Email firstlast@monitoringtimes.com

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Re_Inventing Radio through Design and Necessity



FR250 \$50* Multi-Purpose

Stay informed and prepared for emergencies with this self-powered 3-in-1 radio, flashlight and cell-phone charger — no batteries required.

- _ AM/FM/Shortwave Radio Reception
- _ Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)

- _ Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- _ Built-in 2 white LED light source and one flashing red LED
- _ Dimensions: 6-1/2"W x 6"H x 2-1/2"D
- _ Weight: 1 lb. 3 oz.
- _ Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack



FR200 \$40* Crank it Up

Without the need for batteries, this self-powered 2-in-1 radio and flashlight helps you stay informed and prepared for emergencies.

- _ AM/FM/Shortwave Radio Reception
- _ Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)

- _ Built-in white LED light source
- _ 12 international bands
- _ Dimensions: 6-1/2"W x 5-3/4"H x 2-1/4"D
- _ Weight: 1 lb. 2 oz.
- _ Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack
- _ Available colors: Metallic Blue, Metallic Red, Sand



FR300 \$50*

All-In-One



This all-in-one unit offers functionality and versatility that makes it ideal for emergencies.

- _ AM/FM/TV-VHF/NOAA Radio Reception
- _ Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- _ Can be powered from four different sources:
 1. The built-in rechargeable Ni-MH battery that takes charge from the dynamo crank and from an AC adapter (AC adapter not included)
 2. 3 AA batteries (Not included)
 3. The AC adapter alone (AC adapter not included)
 4. The dynamo crank alone, even with no battery pack installed
- _ Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- _ Built-in 2 white LED light source and one flashing red LED
- _ Weather alert
- _ Dimensions: 6-1/2"W x 6"H x 2-1/2"D
- _ Weight: 1 lb. 3 oz.



S350 Deluxe \$150*

High-Performance Field Radio with Stereo Headphones

For S350 devotees the deluxe model combines a sporty new exterior with the same unrivalled functionality.

- _ Highly sensitive analog tuner with digital display
- _ Large, full range speaker with bass & treble control
- _ Clock, alarm, and sleep timer
- _ Built-in antennas and connections for external antennas
- _ Headphones included
- _ Dimensions: 12-1/2"W x 7"H x 3-1/2"D
- _ Weight: 3 lb. 4 oz.
- _ Power Source: 4 D or AA Batteries (not included) or AC Adapter (included)
- _ Available colors: Metallic Red, Black ■■

Improvements over S350:

- _ FM- stereo via headphones
- _ AM/SW Frequency Lock
- _ Set clock and alarm while radio plays
- _ Operates on 4D or 4AA batteries



S350 \$100*

Ruggedly Retro

With the look of a retro field radio sporting a rugged body and military-style controls – the S350 also features today's innovation for excellent AM, FM, and Shortwave reception and a large, full-range speaker for clear sound.

- _ AM/FM/Shortwave Radio reception
- _ Highly sensitive and selective analog tuner circuitry
- _ Liquid Crystal Display (LCD), for frequency and clock display.
- _ Digital clock with selectable 12/24 hour format
- _ Dimensions: 10-3/4"W x 7"H x 3-18-1/2"D
- _ Weight: 3 lb. 2 oz.
- _ Power Source: 4 D Batteries (not included) or AC Adapter (included)



YB550PE \$100*

Digital expertise

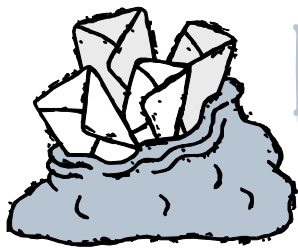
Offering high-tech digital performance and portability, the YB550PE packs performance into a small radio. Palm-sized and only 11oz, the YB550PE can receive AM, FM, and continuous Shortwave across all 14 international bands.

- _ Shortwave range of 1711 – 29,995 KHz
- _ Autoscan, direct keypad, and scroll wheel tuning
- _ 200 customizable station presets
- _ Alarm and sleep timer functions
- _ AC adaptor and supplementary antenna inputs
- _ Dimensions: 3-1/2"W x 5-3/4"H x 1-1/2"D
- _ Weight: 10.5 oz.
- _ Power Source: 3 AA Batteries (included) or AC Adapter (not included)



*Prices do not include Shipping/Handling and applicable taxes.
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LETTERS TO THE EDITOR

TWO VIEWS ON THE FCC

Comments by Steve Green, Owner, Over The Edge Micro-Radio, Legal FCC Part 15 Compliant Non-commercial Radio Stations AM 1680 kHz FM 104.9 MHz, Santee, California (bordering San Diego); <http://home.mindspring.com/~overtheedgeradio/index.html>

"If you talk to the average leftist, he will complain that radio is run by a few greedy corporations. If you talk to a right winger, he will complain of left wing media bias. Virtually nobody will come out and accuse the entity that has done the most to damage radio: the government and its enforcement arm, the Federal Communications Commission.

"Now I'm going to shock many of you. Radio can be an organized, free media, with no government legislative and administrative apparatus.

"Suppose when radio was invented, frequencies were treated as property rights, just like land in the United States has been. When the western United States was being settled there was a small place for legitimate government action: it was called the homestead. Those who settled and used vacant land were granted a property right in the land.

"Now let's apply that theory to the invention of radio in the early 1900s. The best way to govern radio would have been to let those inventors and experimenters who 'settled' on a frequency own it with a 'radio homesteading act.' They could then buy and sell those frequencies on the open market.

"Band plans would develop through free market agreements.

"Statistic critics will quickly assert chaos and interference. These are people who cannot conceive of the free market working, but there is some tiny room for the government. Not by having the Congress enact a massive communications act and not by granting some administrative entity sole police powers over all of the radio spectrum. The solution is simply treating radio frequencies as any other piece of private property: by allowing owners of frequencies to use the civil court system, or better yet, private arbitration, to enforce their property right. If I am your neighbor and throw trash on your land, you can get a civil action to stop me. If I own a radio frequency and you have a sloppy transmitter which causes me interference, you have violated my property rights and should be subject to civil action.

"This system is not perfect, but this is an imperfect world with imperfect people in it. You will never have utopia and some errors in the civil system will occur. However, this system prevents arbitrary rules, weakens powerful legislative lobbyists, and allows the most freedom

while still preventing radio from becoming chaotic.

"How do we get there from here? It really isn't that difficult. Put radio frequencies out to bid. Existing users of frequencies should be allowed first refusal. Public safety, hobbyists and not-for-profit users could be given the frequencies at a deep discount or even free. Amateur radio bands could be given to the American Radio Relay League for a nominal fee of \$1.

"The ARRL could then become the arbiter in case of dispute between HAM radio operators. Present amateur rules could be grandfathered for current licensees. Part 15 operators, such as myself, could be given the opportunity to run low power but more substantial radio stations. The big broadcasters would probably maintain their empires for now, but with no government favors, a free market and competition, their power would be diminished. With all of the arbitrary rules gone, radio and television could finally live up to its potential. Programming would become far more creative. New technologies will expand much faster than the breakneck speed that they already are. The FCC would be eliminated and the ability of the politicians to interfere will be kept to a minimum. This change would be radical but the benefits will be substantial."

A very similar point of view was expressed in a news story sent to us by Arnal Cook, concerning a report released by the Progress & Freedom Foundation (PFF). The PFF is leading an effort to write a replacement for the Communications Act to be known as the Digital Age Communications Act.

"The Federal Communications Commission should be modeled after the Federal Trade Commission with a *focus on competition principles and an ability to respond to abuse of market power*," said the PFF. "In a digital era of increasingly intense competition among services and across platforms, the existing communications regulatory model based on controlling monopoly power is no longer relevant ... Regulation in the digital age should be based, almost exclusively, on competition-law principles drawn from antitrust law and economics."

The following comments are by Arnal C. Cook N9ACC, who strongly disagrees with this approach.

"I wholeheartedly disagree with their market/monopoly based conclusion. The RF spectrum is a unique public resource. Abandoning it to market dictates will 'exterminate' many valuable services in the stampee and barbed-wire approaches to staking claims. We need a technologically savvy and engaged FCC

to carve out fair and equitable RF harvests for every service while maintaining room for experimentation and adoption of new technologies. Abandoning these principles for the FCC to properly administer the RF spectrum is akin to closing down the Patent office around 1903 (I think) 'because everything of value that could possibly be invented had already been done!'

"If we abandon the RF Spectrum to today's technology 'polluters' (as each 'wideband' technology is seen over each succeeding narrow banding), there will be little, if any, drive to better technologies that makes room for more industries to use RF spectrum more efficiently, or in an entirely new way."

Though I'm no expert, this editor tends to agree with Arnal Cook that market forces (i.e., big business) cannot be trusted to look after the public good. My suspicion is that the small independent efforts would be quickly forced out by broadcasters with big bucks looking for a presence in as many markets as possible. I grew up in coal country, and stewardship of natural resources and safety of miners was not a priority of "market forces."

Federal agencies are certainly not totally benign, either, but it seems we function best when business, government, and public watchdog groups all keep an eye on each other!

- Rachel Baughn, Editor

Bringing SWLs into the "New World"

Following is a portion of a letter John Figlio received with regard to his recent Programming Spotlight columns:

"Just wanted to tell you I am enjoying the program info you have been including regarding the various media by which international broadcasts are available. I do not have access to streaming media. However, I have both XM and Sirius and it's good to know what's on when. You have really made strides in that department for SWLs."

- Sheryl Paszkiewicz, Manitowoc, WI

John replied, "Thanks very much for this, Sheryl. It is a bit of a risk to try and bring long-time SWLs into the 'new world' as it were; but I think it's important to do so if only to preserve the best of what we all like about international broadcasting. I'm glad that you share this sentiment. Change (along with perhaps death and taxes) is the only constant. Hopefully, I can help make the journey more interesting and less threatening.

"You may want to also check out www.publicradiofan.com. The site allows you to customize its listings to reflect what is being broadcast on the Sirius and XM channels carrying public and international broadcasters."

- John Figlio, Programming Spotlight

GROVE

Sangean ATS-909

The Leader of the Pack...

Arguably the best compact portable on the market! Measuring only 8-1/2" wide and weighing less than two pounds, this dual-conversion, PLL-synthesized receiver stores more than 300 memory frequencies from 150 kHz-30 MHz and FM broadcast! Choose wide or narrow filters to optimize reception, and listen to stereo FM from the headphone jack! A recorder jack allows you to preserve important broadcasts. Digital clock/sleep/timer with alarm shows 42 world cities' times; signal strength indicator assists in tuning. AC or battery powered with battery level indicator for convenience or emergency.

Alphanumeric display aids station recognition, and you can accurately direct-enter frequencies via the keypad, or manually search with the rotary tuning dial. Fine-tune those SSB stations with 40 Hz precision, or let the 909's automatic search feature find the strongest shortwave stations for your listening pleasure! What more could you wish for in an affordable, high performance, world band receiver?



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ICOM PCR1500

Ultra wideband coverage

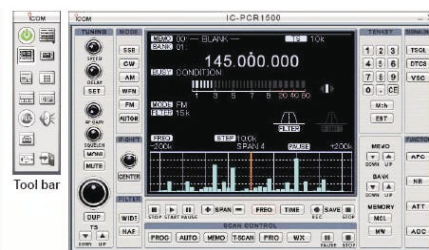
The IC-PCR1500 is a PC control receiver and all functions are controllable from mouse click or keyboard. It covers 0.01 to 3299.999MHz* in AM, FM and WFM modes and also covers 0.495 to 1300MHz* in SSB and CW modes. (Less cellular)

USB cable connection

The USB cable provides higher data transmission and quick response. It is also possible to transfer the received audio to the connected PC via the cable and allow you to hear from the PC speakers or record the sound on the PC.

Multi channel monitor function

Up to 25 channel activities can be observed on the multi-channel monitor screen at a glance. According to the S-meter level, each channel status is visually displayed by three background colors. When you click a busy channel, you can easily start listening to the selected channel.



Order RCV15 Only \$**579^{95*}**

For even MORE versatility, buy the R1500, with the removable control plate! That's right, turn your **computer-controlled** receiver into a **PORTABLE** receiver by plugging in the control plate! Now you can have the best of both worlds in just one receiver!



Order RCV25
Only \$**699^{95*}**

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Now!**



COMMUNICATIONS

FCC

Expanded Band Comes of Age

Hard to believe, but it's been nearly 20 years since the Federal Communications Commission first began the process of expanding the AM band to reduce crowding and interference. The FCC ruled that 88 of 710 interested stations were eligible to apply for construction permits in 1997; of those 88, only 66 elected to file construction permit (CP) applications, and only 56 actually built a new station. As an incentive to move, stations were allowed to keep their original frequencies for five years, but this year is the deadline for most stations operating on the expanded band to decide which frequency they want to keep.

Of course, the FCC's preference is for them to continue in 1605-1705 kHz to help relieve interference, and most stations probably will. While the upper end of the AM dial doesn't have the best propagation characteristics, most broadcasters have found their signals have a larger footprint, due to the lack of interference from other stations. Either way, the deadline means a few new slots will soon be available in both the expanded and standard AM bands.

Cable a la Carte

The FCC recently released a new report which acknowledges that consumers could conceivably lower their cable or satellite TV bills by being able to order only the channels they want. A previous FCC report with the opposite conclusion had been based in part on a flawed analysis by Booz Allen Hamilton and funded by the cable industry. Parents and other concerned groups have been asking the FCC to pressure cable companies to offer the "a la carte" option so they can avoid receiving and paying for offensive or inappropriate programming.

FCC Requests Budget Increase

The FCC has requested a 4% increase in its budget for 2007, for a total of \$302.5 million. Of course, it has to raise a good portion of that money itself through regulatory fees and a proposed spectrum user fee.

Some of the FCC's intentions are to replace its fleet of aging vehicles, update direction-finding gear it uses to locate interference sources and unlawful spectrum users, and increase its travel budget. The FCC also wants to automate the process of frequency coordination between the various Bureaus, National Telecommunications and Information Administration, other federal and defense agencies – all of which is still being done manually!

FCC Fines Ramsey Electronics

Ramsey Electronics, a catalog retailer of small electronic and radio equipment and kits, was fined \$25,000 for marketing two models of unauthorized FM broadcast transmitters and two models of external RF power amplifiers.

Following up on a complaint, the FCC's Enforcement Bureau says it found Ramsey selling two unauthorized models of assembled FM transmitters, the FM35WT and FM100BWT, and RF amplifiers designated as PA100 and LPA1WT. Although Ramsey requires buyers to sign statements that the transmitters will be exported, the FCC rejected that defense, because the Rule requires that the manufacturer actually exports unlicensed equipment. Ramsey also claimed the RF amplifiers were not intentional radiators, but that argument was also rejected as the Rules prohibit manufacturing or marketing any external RF power amplifier capable of operation in the frequency band between 24 and 35 MHz.

The Commission fined Ramsey \$7,000 for each of the four models, then knocked off \$3,000 for past good compliance for a total of \$25,000. Ramsey had 30 days to pay, or seek a reduction or cancellation. The supplier must also submit a report describing what steps it has taken to come into compliance.

BROADCASTING

Unhappy with Digital Radio

Digital radio, making its debut in the US using a different protocol than that adopted in Europe, gives access to dozens more stations and displays channel and program information. (See this month's feature article.)

Music lovers in the United Kingdom are complaining that the sound quality on digital radio (DAB) isn't living up to its potential and is worse than traditional FM. While digital transmissions have none of the hiss or crackle found on traditional radio, critics say the BBC and commercial broadcasters have crammed so many new stations into their digital transmissions that they have sacrificed quality for quantity. On hi-fi systems, the lower bit-rate results in audio which sounds tinny or muffled. On the other hand, there is general agreement that portable radios are significantly improved.

The Swedish government has decided to withdraw its support for digital radio. The government said it would not be approving a schedule for turning off FM transmitters, citing the hardship on consumers to replace all their FM receivers and questioning whether all digital alternatives had been explored. Swedish Radio Director General Peter Örn said the government's DAB decision would not affect its test broadcasts in digital DRM.

Cuts Coming for Public Broadcasting and VOA

Deep cuts for public broadcasting have been proposed by the Administration in the fiscal year 2007 budget for the Corporation for Public Broadcasting – cuts that could eliminate the Public Telecommunications Facilities Program, a funding source for stations converting to digital and still recovering from Hurricanes Katrina and Rita. (See story on page 14 for more on the digital conversion process.)



The Administration proposes rescinding \$53.5 million from the \$400 million already appropriated by Congress for 2007 and cutting \$50 million rescission from the \$400 million already appropriated by Congress for 2008. The budget proposal includes no additional funding in 2007 for digital conversion or television interconnection.

If enacted, these 2007 funding levels would represent a 24.7% reduction from 2006 levels, and would be felt in all CPB programs, including station Community Service Grants, the basic grant each station gets if they meet minimum qualifications, the organization said.

The Broadcasting Board of Governors announced "painful cuts" in its proposed 2007 budget for international broadcasting. While the budget represents an overall increase of 4.3%, language services and programs not aimed at fighting terrorism will be sacrificed. The BBG proposes the elimination of the English-language *VOA News Now* program on shortwave, and elimination of VOA broadcasts in Albanian, Bosnian, Croatian, Greek, Georgian, Hindi, Macedonian, Serbian, Russian, Turkish, and Thai. Television broadcasts in Albanian, Bosnian, Macedonian, Serbian, Russian and Hindi would continue. (See page 32 for more on this story.)

World's Tallest TV Tower

The ground breaking ceremony for what will be the world's tallest TV tower has taken place in Guangzhou, South China, host city for the 2010 Asian Games. The tower will be one of the tallest buildings in the world – reaching 2001 feet in height!

MISCELLANEOUS

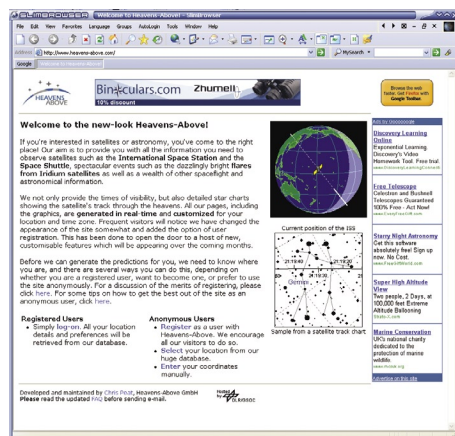
Western Union Telegram Service STOP

Along with commercial use of Morse code, the telegram is vanishing. After 155 years in the communications business, Western Union discontinued its telegram messaging service January 27th, becoming strictly a financial services company.

Although Western Union succumbed to the competition of e-mail, text messaging, and cheap long-distance calling, telegrams are not yet defunct. Senders wishing to make extra impact can still send telegrams via companies such as Swiss-based Unitel Telegram Services, which has offices in 44 countries.

Stealth Satellite

Scanner listeners and shortwave communications buffs (utilities) are accustomed to being considered a little weird and possibly even suspicious by the public at large. Well, satellite spotters are even more so. These observers, who congregate on a Web site called Heavens-Above (www.heavens-above.com/) and a mailing list called SeeSat-L, have amassed an impressive collection of information and expertise.



For the past twenty years, they have played a high tech game of hide-and-seek with the US's National Reconnaissance Office. Coordinating their efforts, amateur observers in Europe, North America, and South Africa monitor satellites at different phases of their journeys and extrapolate the precise dimensions of their orbits.

Most hobbyists observe part-time from their balconies and backyards with minimal equipment or just the naked eye, but nonetheless they are usually able to spot almost any satellite the NRO blasts into space. Except for one – a satellite known as "Misty," first launched in the early 1990s. It bothers the NRO that the observers know about the satellite at all, much less that they keep watching for it.

Former US senator Bob Kerry (D-Neb) has suggested anyone who publishes spy-sat information is guilty of supporting terrorists. This is familiar territory to those of us who are

sometimes criticized for publishing military or even public safety information. However, the fact that anyone can make their own observations with a pair of binoculars or listen in on communications can be a worthwhile reminder to the government: If hobbyists can figure out where your spy satellite is or where your communications are, the bad guys can, too.

For the full article on the satellite observers, check out the *Wired Magazine* article by Patrick Radden Keefe at www.wired.com/wired/archive/14.02/spy.html

Taking Low Frequencies Lower

In response to several deadly mine accidents in January, the federal Mine Safety and Health Administration is considering a couple of safety system currently being used in Australia. One is a personal emergency device (PED) developed by Mine Site Technologies of Australia. The PED requires installation of a surface or underground antenna loop that can radiate a low-frequency radio signal which causes a miner's cap lamp to flash, alerting the miner to check a text message sent to a pager-like device on his belt. Also under consideration is Mine Site Technologies' Tracker IV system, which tracks tags issued to miners or attached to equipment to pinpoint their locations in underground mines or tunnels.

On-Scene Interoperability

Sometimes simpler is better. While interoperability channels and technical solutions may enable incident commanders from different agencies or at different emergency scenes to talk to each other, a team of emergency responders in Connecticut has devised a way for any ground-level workers to communicate with one another. Rescue crews from several agencies can talk to each other at the scene of an emergency or disaster, even though they may have different radios and frequencies.

Dubbed STOC, for "on-Scene Tactical Operations Channel," the specialized portable repeater combines a radio and receiver into a single box that instantly receives a signal from one frequency and sends it onto another frequency. "The beauty of the device is, we don't have to buy more radios," said Wayne Sanford, the state's deputy homeland security director.

State officials have allocated nearly \$2.1 million to build a box for towns across the state, Sanford said.

Communications is compiled by editor Rachel Baughn KE4OPD from newspaper clippings submitted by our readers. Thanks to this month's fine stable of reporters: Anonymous, Mark Cobblestick, Norman Hill, John Mayson, Stephen Newlyn, Jerry None, Ken Reitz, Michael Reynolds, Doug Robertson, Robert Thomas, Larry Van Horn, and Ed Yeary; also Dispatch Monthly, Mobile Radio Technology, Radio World.

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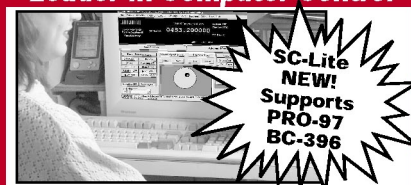
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An *MT* How To: The Beginner's Guide to TV DXing

By Gayle Van Horn W4GVH
All photos courtesy Larry and Gayle Van Horn

Every so often, I tire of watching the *talk-ing heads* bantering back and forth on the satellite dish and switch over to the terrestrial television channels. And depending on the time of the year, I occasionally get an unexpected surprise – distant television (TV-DX) signals from outside my local area.

Yes, you heard right, I said terrestrial television, the medium we grew up watching. Remember those days? We had three channels and were proud to have that! When Public Broadcasting Service (PBS) was added to our channel selection, we thought we had hit the big time! Unless of course, the president was on that night ... simulcasting on all four channels, thus ruining our evening of Andy Griffith! Today, in this fast paced world of instant entertainment at our fingertips, it's easy to forget the four channel TV days.

If you're not familiar with the term "TV-DX," chances are you've seen it and it may not have occurred to you that it is a phenomenon closely followed by a select group of radio hobbyists around the world. In this article we will explore some of the basics of TV-DX, including what it is, how (and why) it suddenly appears on your television screen, and some internet resources.

What is TV DX?

Chances are, you've seen a snowy image fade in and out, or perhaps some wide black horizontal lines suddenly appear on TV channels 2 through 6 – followed by the realization that you have no local TV stations on those channels. If you're lucky, you may see a station identification logo on the screen that has been transmitted from a station hundreds or thousands of miles away! That is what we call TV-DX, and it involves receiving long-distance broadcast stations on terrestrial television.

The concept of receiving long-distance television signals involves an understanding of the different ways broadcast signals can be sent and propagated from a station to your television.

E-Skip Time

Our first and most popular propagation mode involves the phenomena known as Sporadic E propagation, also called E-skip or Es. Sporadic E-skip occurs when a VHF TV signal



KMID Midland-Odessa TX

strikes an ionized area of the E layer of the atmosphere (usually 50-75 miles high), causing the signal to be "reflected" back to earth. Es is a highly unstable form of propagation which will first affect the lower VHF channels from 2 through 6, and sometimes channel 7. On very rare occasions, Es has been observed by a few hobbyists as high as channel 13.

E-skip cannot be predicted and can occur any time of the year, with the most active periods occurring during the summer months, from early May to August in the Northern Hemisphere, and early November to February in the Southern Hemisphere. You're likely to also see an abbreviated Es skip season in the northern hemisphere around Christmas and into early January.

Start your search for Es by checking for distant video on the lowest open TV channel, usually channel 2. If you have a scanner capable of TV audio reception, you can also park it on 59.750 MHz (TV channel 2 audio frequency) and use it as an identification aid.

As an E-skip opening becomes more intense, the Es condition will be seen on higher TV channels; the more intense, the higher the TV channels E-skip affects. But as the intensity



KPRV Pierre SD

of the opening rises, the skip range on the lower TV channels shortens (i.e. closer-in station become visible again). This is a key to clue the DXer to check higher channels for activity.

Es conditions at a given receiving location change as the ionized clouds move around. A TV station signal coming from Florida might be seen all along the Gulf Coast, past Texas, and well into Arizona and beyond, and is known as a "single hop." My own personal best during E skip conditions was watching Mexican television on a hot June afternoon from here in western North Carolina.

Last summer, DXers in Michigan logged sunset reception from Pensacola, Florida, and Texas stations from Amarillo, Houston, Dallas, San Antonio, and Harlingen via E-skip propagation.

A DXer along the East Coast or West Coast may have a shot at receiving what is known as a "double hop" E-skip opening. This occurs when you have two Es clouds where a signal strikes one cloud, bounces back to earth, bounces up to another cloud and back down again. Double hops are rare, but TV-DXers on both coast dream of receiving signals from 2,000 or more mile away via a double hop Es.

The best way to catch an Es opening is to leave your television set on continually, tuned to the lowest open channel, or check conditions on the hour or half hour when TV stations are supposed to identify their stations.

Gone Tropo?

No, not the *Gone Troppo* song by George Harrison; I mean another propagation mode known as Tropospheric or Tropo DX. This involves the bending and ducting of signals due to a certain type of weather phenomena in the tropospheric regions of the atmosphere, and it is one of the prime modes used by the TV monitor. Unlike Es, Tropo is a more stable form of propagation, and openings can extend from 200 to 1000 miles or more for hours on end.

As mentioned, Tropo conditions are a direct result of the weather. A high pressure system is required for Tropo to occur. When a temperature inversion occurs, with warm air converging with cold air, there is a low level connection formed in the troposphere. This causes the VHF and UHF signals to travel be-



AETN Jonesboro AR

yond their normal areas. Tropo is most likely to occur in the morning and evening during spring and summer, as it builds up quickly after sunrise and gradually burns off as the day progresses. After sunset, tropo often returns. September and October are usually the best months for tropo conditions.

UHF channels are most affected by tropo conditions, so check the open channels near the top of the UHF band first, as well as the low (2-6) and high (7-13) VHF channels. You'll know you've "gone tropo" when you see a steady signal with slow fades on normally vacant TV channels at your location. Sometimes you'll even see noise-free TV signals, in full color. Tropo may appear for a few hours, or could have a clear and steady signal for days. If that happens, don't ignore an opportunity to log a bunch of new stations for your logbook.

Long distance reception may also be possible when a dust storm exists along a front stretching in a straight line from your location to a distant TV station. Also, during a mild winter, autumn or spring, "Gulf tropo" can blanket the entire Gulf coast from Florida to Mexico for a week or more at a time.

Fog also produces good tropospheric conditions as a result of high-pressure weather. If such conditions result in a belt of fog with clear sky above, there will be heating of the upper layers of the fog bank, causing an inversion. This condition often occurs toward nightfall, continuing through the night and clearing about sunrise.

Ms, Au, Ls, F2 and TEP

No, this isn't a cryptography code, but a few of the abbreviations commonly used by TV DXers to describe some of the more exotic propagation modes used to view TV DX.

Meteor Scatter (Ms) is a relatively short-



KACV Amarillo TX

lived and very weak propagation mode, normally peaking around sunrise. Meteors entering the atmosphere burn up in the ionosphere and often leave an ionized trail that can reflect TV signals. These very small signal bursts may last only a few seconds or longer during meteor showers. Television channels 2-13 are most affected by this mode.

Auroral Scatter (Au) involves signals that bounce off the northern lights (aurora borealis) during periods of high solar activity. Signals from 200 to over 2,000 miles are possible, and are caused by intense geomagnetic activity associated with high sunspot numbers. Conditions are predominantly seen in the northern states, and produce a distorted or smearing signal on VHF TV.

Signal bursts can pop up due to Lightning Scatter (Ls) with distances of up to 300 miles. The strongest Ls signals occur in the UHF TV band. But don't forget to take lightning precautions if you're using an outdoor antenna and the storm is within 5 miles of your area!

A less frequent event occurs around the peak of each sunspot cycle known as F2 skip. The F2 layer of the ionosphere can propagate VHF signals several thousand miles beyond their intended area of reception. The height of the F2 layer is some 200 miles, resulting in the single-hop distance of thousands rather than hundreds of miles. F2 skip reception is directly related to radiation from the sun on a daily basis and/or in relation to the sunspot cycle. Television pictures propagated by F2 reception are usually seen at midday with a multiple or smearing image.

Another rare but possible occurrence is transequatorial propagation. TEP propagation is caused by a breakup of the F2 layer above the equator into clouds of higher ionization. TEP makes it possible for television reception between 3,000-5,000 miles across the equator on VHF television. Afternoon TEP peaks during the mid-afternoon, while early evening hours are generally limited to 4,000 to 5,000 miles. Afternoon TEP signals may have high signal strength and suffer moderate distortion due to multipath reflections. Evening TEP is suppressed by moderate to severe geomagnetic disturbances, and more heavily dependent on high solar activity than the afternoon type.

TV DX Equipment

Now that you have an understanding of the basic propagation concepts of TV-DX, what about equipment? When choosing a television for DXing, look for one with a good clear picture, not only on local stations, but on snowy, marginal ones as well. The picture should stay locked-in even as the signal fades down to nearly nothing. A color set is not essential, since it adds little to DXing and color televisions require a stronger signal to produce a usable picture.

Since there will usually be fading and interference, a portable black-and-white set is generally adequate—one without extra gadgets that tend to hinder reception. Analog televisions are more sensitive: an advantage for tuning away from images and spurs or fine tuning a weak signal. Several frugal DXers use the old



KRIS Corpus Christie TX

tube/transistor-type black and white televisions, and who hasn't seen those at a garage sale?! The analog tuning of TVs made in the late 1970s to mid 1980s enable you to "fine tune" for various offsets very easily.

As with radio reception, antennas have the greatest impact on how much DX you receive and how it will come in. Unless your location is within a few miles of the transmitter, you want the highest possible gain. Your best bet is to install an outside antenna. The higher the antenna above the ground and above an average terrain, the better results are possible. Try to place the antenna above trees, buildings, and power lines.

A second antenna installed lower in height may help reduce or eliminate interference from nearby stations during an Es opening. You might also consider mounting an antenna vertically for Es reception, to reduce interference from nearby stations.

If possible, use separate antennas for VHF and UHF, as this will give you the best results. But many use a log periodic antenna or a broadband yagi with exceptional results across both bands. A preamplifier is not needed for VHF, since it will usually cause your set to overload on local stations.

For UHF reception, a parabolic dish is recommended. The most popular dishes range in size from six to seven feet. And a good low-noise preamp is also recommended for UHF DXing.

Keep the lead-in wires from your antennas to your TV set as short as possible, since a poorly chosen lead-in can eliminate the increased gain the receiver and antenna may provide. And if you use directional antennas, you'll need a rotor. Using one will let you position your directional antenna toward the incoming TV signal.

If external antennas are not an option, old-fashioned rabbit ears or a whip antenna have been used with surprising results for apartment dwellers when DXing the lower channels dur-



WBBJ Jackson MS



WGBH Boston MA

ing E-skip openings. If you'd like to experiment with TV-DXing prior to investing in antennas, preamps or rotors, a set of rabbit ears and a good E-skip opening will be a good introduction to the world of TV DX.

Preserving your DX

A VCR is a terrific aid for the TV DXer. You can replay questionable station logos or identifications. This is a valuable record of your DXing activities, especially should you view intense E-skip conditions. However, many modern VCRs will go to a "blue screen" in the absence of a strong signal. Look for a menu option on the VCR to turn that function off. Some hobbyists use a CamCorder focused on the television screen to record their DX session.

A digital camera can be used to preserve TV-DX. Don't forget to turn off the flash to avoid a washed-out image. Setting the camera atop a tripod will eliminate a blurred image from a shaky camera operator. If you are using a 35mm film camera, use 400 ASA film, either for print or slides. (The latter will produce a sharper image.) For most conventional TVs, whether black and white or color, set your camera speed at 1/60 of a second to synch with the television video. This will keep from introducing unwanted video artifacts into your pictures.

Keeping it all together

AM, FM and shortwave enthusiasts keep a log of their DX sessions and TV DXers also keep detailed logs. By doing so, you can follow propagation trends observed during your viewing sessions. Record the station call, location, and date, including the day of the week, propagation mode, and distance. Most experienced TV DXers keep a running minute-by-minute log during evenings. Each time a distant TV station is received, consider it an important propagational event, and a record should be kept of it, even if you have seen the station before.



WKRG Mobile AL

Can I QSL a TV station?

Yes!

Collecting television verifications is an important part of the TV hobby. Verifications have been received from Central and South America, Canada, and throughout the United States. Stations will verify a report, but you might consider explaining the TV DXing hobby to the Engineer to advance your cause. Enclosing a photo or slide will likely support your request.

A few stations have QSL cards; however, it is a good idea to enclose a prepared QSL card they can sign and return to you. Return mint postage is always appreciated, as well as an addressed return envelope to yourself. In case you log a foreign station, return postage for most countries is available from Bill Plum's DX Service, 12 Glenn Road, Flemington, NJ 08822-3322. For a current price list, send Bill a self-addressed envelope.

On-line language translators will assist you in constructing non-English letters to foreign stations. Services like Babel Fish Translation <http://babelfish.altavista.com/> (or) Free Translation-Free Text Translation www.free-translation.com/free/ will help you write that foreign language letter. Be sure to convert UTC times to local times for any foreign station you write, and an aid to do this online is to use the World Time Server at www.worldtimeserver.com/current_time_IN.aspx

TV Reference Aids

Staying current on station information and propagation will help increase your station totals and country count on the TV bands. There are several good online references to aid you in this regard.

Propagation is your number one priority to follow and two sites represent the best on the net – William Hepburn's VHF/UHF Tropospheric Ducting Forecast <http://home.cogeco.ca/~dxinfo/tropo.html> and Tomas Hood's Propagation Resource Center <http://prop.hfradio.org/>

If you observe an unfamiliar logo via E-skip, you may be able to identify it on one of the TV VHF channel maps at www.egrabow.com/gallery. You can also brush up on Latin American logos at the TV DX Exposition <http://nldxer.tripod.com/TMTVDXPindex.html>, maintained by Danny Ogleshorpe. His site is loaded with photos, TV DX from Mexico and links on tropo and DX records. Fred Cantu also covers the Mexican TV scene at www.mexicoradiotv.com/.

MT's *American Bandscan* columnist Doug Smith has an excellent website covering TV technical information for DXers with links to his TV Database Online, European Band I TV, US stations, frequencies and more at www.w9wi.com/

With spring tropo season upon us, don't forget to visit the Worldwide TV-FM DX Association at www.anarc.org/wtfd/. The WTFDA is the leading source of information dedicated to the observation, study, and enjoyment of long distance propagation of television and FM broadcast signals. Their monthly bulletin, the



WLBZ Bangor ME

VHF-UHF Digest, contains loggings, TV and FM news and general items of interest to DXers. The WTFDA also hosts an annual convention where enthusiasts gather to exchange tips and information on the hobby of FM/TV DXing. For more information on membership visit their website or write to: Worldwide TV-FM Association, P.O. Box 501, Somersville, CT 06072 USA.

Get Ready, Get Set...

Now that it is April, it is time for the spring tropo season and time to begin following propagation religiously (if you aren't already). Dust off that old black and white television and start channel checking.

If you don't have one, start prowling garage sales, thrift stores, or drop in at one of your local discount chain stores and you may find a new one for an affordable price. TV DXing does not require much of a budget, and if you've stretched a dollar till it squeaks, remember rabbit ears or a whip antenna are an option for E-skip reception!

And, be sure to drop us a note and let us know your results. Send your logs to Doug Smith and his *American Bandscan* column. If you get a QSL, share your results with me for my *QSL Report* column.

I could go on and on about TV-DX ... but I see the talking heads are at it again on the satellite dish, and so it's time to see if tropo is here! Mount those cameras on the tripod, warm up the VCR, and here's hoping this and future DX seasons will bring lots of clear, stable, distant video signals to your television set.



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Courtesy: Polk Audio

Hi-Def Radio Fights Death Star

By Ken Reitz, KS4ZR

Even before the first XM and Sirius satellites had been launched, land based AM and FM broadcasters, through their once powerful lobby the National Association of Broadcasters (NAB), sought to stop satellite radio in its infancy by setting up legal roadblocks. The FCC consistently dismissed them.

The NAB doubted the public's interest in buying expensive add-on receivers and coughing up a monthly payment for the service. But to date more than 11 million people have done so in only four years. Broadcasters clung to their tradition of carrying local weather and traffic information. Satellite radio added them. The broadcasters fell back on their 100 year relationship with professional and college sports. But XM wrapped up Major League Baseball in a 10 year contract while Sirius picked up the National Football League. And, as if to cement their new dominance, both satellite companies broadcast the major college conferences in a full schedule of football and basketball games.

Satellite radio has proven attractive to individual personalities who have turned their considerable following into even more paying subscribers. Howard Stern began his much ballyhooed run on satellite in January. Bob Edwards, dumped by National Public Radio as too old, has enjoyed a full year at his new home on XM Public Radio. Both have a new found freedom on satellite: Edwards from the poor judgment of radio network management and Stern from the constraints of FCC decency standards.

With virtually all new car radios now satellite capable and the soaring popularity of home based satellite receivers, terrestrial broadcasters have become less relevant. Is there help on the

horizon? Could some new technology bail out the sinking ship? Will there be any help from the FCC?

IBOC HD Radio

In 1998 the FCC authorized radio industry interests to develop a system of transmitting digital signals on the AM and FM bands. This industrial consortium of broadcast entities from manufacturing, engineering and programming is known as iBiquity. They produced a digital broadcast scheme for the AM and FM bands called In-Band On-Channel (IBOC), which is promoted in the radio industry by the more brand friendly term "HD Radio." The trick was to be able to transmit this new digital mode at the same time as the analog signal, as mandated by the Commission. HD Radio was to provide a "hybrid" method which bridges the distance between an all-analog AM and FM world to one which is totally digital. Amazingly, it works. Sort of.

Emphasis on early development of the system has been on the FM band where it works quite well. The FM signal is not susceptible to skywave skip and generally reflects the analog signal contours. It's a different story on the AM band. Those in the immediate metro area of an HD AM transmitter will receive an HD Radio signal, giving it an audio quality equal to today's analog FM. But, since AM is mostly a cacophony of voices from hyperventilating sports announcers, political pundits and preachers with precious little music to test the beauty of HD Radio, why bother?

Additionally, fears of interference from IBOC signals on AM carriers in an already packed band has forced the FCC to prohibit HD transmissions after dark. No wonder nobody's talking it up.

IBOC Reality Check

It's been nearly two years since the first HD Radio experiments at WAMU-FM, a Washington, D.C. National Public Radio (NPR) affiliate. As of this writing there are more than 13,000 radio stations in this country (excluding nearly 4,500 translators, boosters and low power FM broadcasters). A little over 1,100 stations are licensed by iBiquity to transmit HD Radio with just over 700 actually on the air, but only 140 of those are transmitting a second HD channel (multicasting). There are a few pockets



Yamaha RX-V4600 high-end, Hi-Fi stereo receiver/amp has HD Radio tuner built-in, is satellite radio ready, handles up to 7 audio sources and pumps 130 watts into 7 speakers. A lot of modern radio for \$1,899. (Courtesy: Yamaha)

of HD Radio and multicasting activity, typically around the major metro areas of the US. Atlanta, for example, has 21 FM stations broadcasting in HD (with 6 of those multicasting); Boston has 20 (with 4 multicasting); Chicago 26 (14); Los Angeles 21 (7); and New York 17 (6).

The big delay, for once, is not because of FCC bureaucratic foot dragging. In fact, once a station has a permit from the FCC to transmit HD Radio, the Commission typically approves a station's request to multicast within a week. And, instead of piles of complicated forms, the Commission requires only a simple letter explaining what the station plans to transmit.

The big delay is the cost of the HD Radio transmitter. A simple retro-fit or modification can't be done to existing equipment and the HD Radio transmitter typically costs \$150,000. This is a substantial investment for even the most well-heeled commercial FM outlets and a barrier simply too high for most independent public radio stations.

HD Radio Technicalities

The two big selling points for HD Radio are clarity of signal (equivalent to audio heard on a compact disc) and multicasting. A third less talked about feature is "text scrolling" similar to that seen on satellite radio receivers which shows the station call sign, frequency, song data (title, author, performer, label, etc.) and any other data the station may wish to send such as weather warnings or traffic information.

To be able to do all of this the iBiquity technology was tested last year in over 75,000



Kenwood KTC-HR100 HD Radio tuner "black box." Use this with any Kenwood radio which is "HD Radio ready" and you'll be listening to multicasting and HD Radio sound. MSRP: \$399.99 (Courtesy: Crutchfield)



New stand-alone HD Radios are just now coming onto the market. This analog/HD radio from Radiosophy brings HD Radio to your desktop, bedside table, or remove the tuning unit and hook it up to your stereo. Has a mobile adaptor kit. MSRP: \$269. (Courtesy: Radiosophy)

hours of over-the-air broadcasts on a number of radio stations across the country. The digital signals were transmitted as sidebands of the host analog carrier running a variety of bit rates in the transmissions. The primary HD audio was a channel streaming 96 kbps. Secondary channels streaming 48 kbps were perceived as having equal audio quality by test listeners. Initial tests indicated that interference to other adjacent broadcast signals was minimal.

In the hybrid period, while analog transmissions continue, broadcasters may transmit up to five different programs, only one of which will likely be in HD. The other music channels, talk/news channels, weather/traffic information, or radio reading services occupy less bandwidth per additional channel than the primary HD channel.

After the hybrid period when all broadcasts are supposed to be digital, stations may transmit as many as eight channels. It's doubtful, however, that any stations will multicast that many channels because of the lack of content, the extra costs of station equipment and workers, or just the notion that stations wouldn't want that much competition to their own primary source of income and listenership.

New Digital Landscape

Obviously, it's early days in the HD Radio industry and, while there may be little happening in your area, there are big things to come. National Public Radio, via its satellite downlink to its extensive affiliate list, has launched five



Boston Acoustics offers this Receptor HD Radio table top model was selling at \$499 but the price was slashed to help fuel demand. Available now from Crutchfield (\$279.99 + shipping) and C.Crane (299.95 free shipping). (Courtesy: Boston Acoustics)

full time feeds for use by member stations. The programming channels will feature Classical, Jazz, Adult Alternative, Electronica & Folk music, and news/talk. Public Radio International (PRI) will feed three services to subscribing affiliates: classical, BBC World Service and BBC Mundo (Spanish). Affiliates belonging to both networks could choose from all available services as well as adding their own programming to make up a customized line-up.

Commercial stations are also feeling their way around this new era. WPOW-FM, Miami, FL, a dance Top 40 station, for example, is multicasting a second channel of similar music without commercials. It's hard to imagine how long that will last.

Current commercial radio program providers are hopping on the HD Radio multicast bandwagon. Jones Radio Network announced this past August the launch of 11 satellite delivered radio formats and ancillary services to be customized by client stations and fed directly into auxiliary HD Radio channels. No extra on-site talent needed.

All of this gives us an insight as to how commercial and public stations will handle the extra channels. Regardless of whether they are commercial or public supported, the extra programming will be satellite fed and run through automated broadcast equipment.

What You Need to Tune In

You'll need an HD-Radio-ready receiver to tune in. You can use a car radio (see Kenwood EZ500 review on page 70), buy a new HD capable receiver such as the Yamaha RX-V4600, the Radiosophy tuner/radio or Boston Acoustics table-top Receptor (see photos). The advantage of the Radiosophy tuner/radio is that you can pop the tuner unit out of the speakers and hook it up to your existing stereo to tune in HD Radio stations. You can also use an optional DC adaptor and use the unit in your car, RV or on a boat. All of these units tune analog AM and FM stations as well.

Listeners in large metro or suburban areas will possibly need a small amplified antenna such as the Winegard SharpShooter (see reviews on page 71) to deal with multipath distortion. Listeners 30+ miles from the HD transmitters will need an outdoor antenna. Any VHF-TV antenna will do, since the FM band is wedged in between channels 6 and 7. It may help to have the antenna on a rotator and possibly a mast-mounted preamp to get a stronger signal to prevent digital drop-outs.

Rural listeners will have the hardest time getting a lock on the HD signal. A large FM-only antenna will be required, with a mast-mounted preamp and a rotator. The vagaries of seasonal reception will still apply and stations which come in without difficulty during most of the year may disappear or have trouble staying locked during the summer months when tropospheric ducting comes into play.

Last Word

Aside from the technical problems of potential interference on both the AM and FM bands when a maximum of stations are broad-

casting in the hybrid mode, there are several other issues yet to be considered: What will be the cutoff date for total conversion to digital radio? What will become of small, nearly insolvent AM stations which struggle to make expenses, let alone invest in expensive digital transmission equipment? How will low power, listener-supported community FM stations find the money for conversion? Will this truly be a rebirth of broadcasting or will it end up more like cable TV: more and more channels broadcasting the same content over and over?

One really bright spot for consumers is that our existing and expensive stereo systems are not made obsolete by the move to digital radio. As with satellite radio, we can simply add an HD Radio tuner to the auxiliary input of our stereos and start listening.

It will likely be many years – industry sources say 10 or more – before we live in an all digital radio world. In the meantime, there will be an unprecedented period of interest in the AM and FM bands as manufacturers introduce new radios, stations attempt to get out of their programming ruts, and listeners have more choice in what they hear for free.

www.ibiquity.com/hdradio/hdradio_hd-stations.htm

To find HD radio stations in your state, go to the above website, click on your state and print out the results. Check in often for updates.

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www.radiosophy.com

AUDIOPHILE HOME HD RECEIVERS:

Audio Design Associates Quadri-Tune
Available summer '06
\$2,800 from Audio Design: 800-HDAUDIO
www.ada-usa.com

DaySequerra
Available summer '06
\$3,000 from DaySequerra: 800-922-8001
www.daysequerra.com

Rotel HD Radio
Available summer '06
No price or product info available
www.rotel.com

Yamaha RX-V4600 HD stereo receiver/amp
Available now
MSRP \$1,899

Venezuela

DXing the Land of Bolivar

By Bogdan Alexandru Chiochiu

One of the easiest Latin American countries to hear on the AM broadcast band from many eastern North American locations, as well as from other parts of the world, is Venezuela. It is a fascinating country to listen to with lots of interesting broadcasters to enjoy, many of them not that easy to hear. But, before we take a look at the stations, let's get to the country first.

The name Venezuela means "Little Venice" in Italian. It was so named by Christopher Columbus, because the way the houses were arranged on the coast was reminiscent of his native Venice. It was Columbus that officially discovered the country in 1498.

Venezuela was ruled by the Spaniards from a regional post in Bogotá for nearly three centuries. During the first quarter of the 19th century, several battles were fought against the Spanish rulers by a national hero named Simón Bolívar, who eventually won the country's independence from Spain. This is why its official name is the Bolivarian Republic of Venezuela, or "República Bolivariana de Venezuela" in Spanish.

The land of Simón Bolívar is a pretty big country, almost twice the size of France. This means that there are plenty of targets just waiting to be logged.

Venezuela has one of the strongest Latin American economies, and despite recent difficulties under the leadership of President Hugo Chavez it is still, next to Uruguay, the South American country with the highest standard of living and a strong medium and upper class. The oil reserves certainly help with the relatively good level of life, but coffee, cosmetic surgery, "telenovelas" (soap operas), and the music industry also help to build a strong economy in this country.

The population of Venezuela is quite diverse, composed of Black, Spanish descendants, Mestizos (persons of mixed Spanish and Indian descent), Amerindians and quite a few immigrants. The Black population is mainly concentrated on the Caribbean coast and is descended from African slaves. The Amerindian population generally lives in remote areas, though many of them are migrating to the cities and are being absorbed into the dominant Latin culture. Some native languages are therefore being lost.

Venezuelan music is quite diverse, consisting of various genres, the most popular being *salsa*, *llanera* (or *zoropo*) and *gaita*. Recently,

a new law was adopted requiring at least half the music and commercials played on the radio to be Venezuelan. This means that knowledge of Venezuelan music is a great plus, if you are serious about chasing Venezuelan stations.

Llanera music is based mainly on harp and a four-string guitar called the "cuatro." Gaita is very similar to salsa dura, which any one DXing Latin America should be familiar with, except the music is even more rhythmic. This music is made mainly in the Zulia state. Personally, I wouldn't recommend listening to salsa dura or gaita music before trying to sleep at night! Tune instead to a station playing llanera if you want something more relaxing.

YV DX

First of all, if you are a newcomer to DXing (listening for distant signals), be aware that Venezuelan transmitting outlets use call letters just like our Canadian and US short-skip domestic targets do. Like the North American radio stations, Venezuelan calls are composed of four letters – the first two are always YV (V for Venezuela) and the last two are unique to the station.

For example, Mundial 550 in Caracas is YVKE; Radio Coro in the Falcón state is YVNM; Mundial Moron 1000 is YVMN, etc. Although few of the stations actually ID with their call-letters over the airwaves, a few, like Mundial 550, YVKE, will have their call letters in some of their jingles.

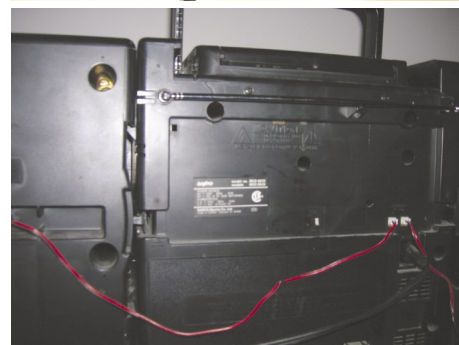
Using "YV" in your DX reports is an easy way to abbreviate the details. For example, to say "YV music" is much shorter than "Venezuelan music." Using YV when talking about Venezuela in a report that you share with other experienced radio hobbyists, is like writing "QRM" instead of "interference" or "QTH" instead of "location."

Venezuela is divided into 23 or 24 states, depending on whether you consider Distrito Federal (the Caracas area) as a state or a district. Personally, I consider it to be a state, because besides the fact that Caracas is very large, it includes other fairly big neighboring cities such as Maiquetía where the airport and YVRQ transmitter are located. Each of the 24 states can be considered a different DX target area. Combine this with the diversity of the Venezuelan music and you have one of the most interesting places the nighttime AM broadcast band has to offer.

Equipment Considerations

It is important to realize that Venezuelan stations use the same 10 kHz channel pattern as most of the Western Hemisphere (with the exception of a few Caribbean islands and Hawaii). Therefore, you will need a receiver with a directional antenna if you want to listen to Venezuela on the MW band, in order to null out as many co-channel stations as possible.

Sensitivity is also an important factor to consider. Some quite simple portables, such as my Sanyo MCD-S830, do the job very well with an apparently large internal ferrite bar antenna. If you aren't lucky enough to find a portable that works well barefoot (without accessories), then there is always the loop antenna. Many models are available, the K9AY from Wellbrook Communications being one of the best.



The author's simple Sanyo MCD-S830 does the job very well.

Investing in a communication receiver such as the Drake R8B and/or going to DXpeditions where you may have access to "Beverage" antennas (wires of several hundreds to several thousands of meters!) are other good ways to improve your reception.

Propagation Basics

Before discussing specific targets, be aware that not all seasons of the year, nor every day of a prime season will produce Venezuelan and Latin American reception. Because of the relatively short hours of darkness during summer months in the northern hemisphere, long-haul propagation on medium wave (MW) and long wave (LW) frequencies is very often nonexistent at inland locations. Summer usually just supports domestic short-skip DX.

Detailed explanation of ionospheric propagation is beyond the scope of this article, but I should say that in mid-June the D layer of the ionosphere, which blocks skywave MW propagation during the daylight hours, never really completely disappears, even at midnight. The reverse is true in December when, at mid-day, the D layer never reaches its full strength. This allows some residual skywave propagation, often quite strong (especially during years of minimum solar activity) from US and Canadian cities located within short-skip distances.

Coastal locations that face the south (east-south-east in the case of Europe and northwest in the case of New Zealand) deserve a special mention, since water is much more conductive for medium-wave skip than earth. This is why coastal DXers like Mark Connelly in Massachusetts get good Venezuelan and other Pan-American or transatlantic long-haul reception all year round.

On the other hand, there are nights when Venezuelan and Latin American signals fill the AM dial, such as after a solar coronal mass ejection (CME) event, even on frequencies where they are usually covered by much stronger short-skip domestic “pests.” Because during such solar and propagation patterns you can sometimes see the aurora borealis or the Northern Lights, these propagation conditions are known as “auroral conditions.”

During such conditions, the ionosphere has the abnormal effect of absorbing high and mid-latitude signals on the medium-wave frequencies while still allowing signals from the tropical and equatorial latitudes to be heard. For example, on 650, with co-channel WSM Nashville kicked off by the aurora, it is possible to pick up Venezuelan YVSH Araguaña Seis-Cincuenta in Maraguay, Araguaña state, along with other more common Latins like HIAT and HJJX. A better example of a routinely heard YV could be RCR on 750 not having fight with Atlanta-based WSB during aurora.

Most aurora-related propagation affects mainly the lower and middle part of the MW band and more rarely the higher frequencies above 1200 kHz, though during a very severe solar storm like in 1989 (when aurora was seen as far south as Cancún), even the upper 1500s will be completely empty of domestic skywave interference!

Generally speaking, however, the higher the frequency, the more stable is the propagation over great distances and the less amount of signal loss occurs. This is why European and New Zealand DXers pick up YV outlets much more easily on the higher portion of the dial. The signals on frequencies above 1200 or 1300 kHz tend to arrive at stronger levels. However, short skip signals will be more consistent, too!



Since auroral effects are much more intensive on the lower and middle of the radio spectrum, YVs are usually received below 1200 kHz in North America, despite the weaker strength of the skip.

Learning the Language

Last, but not least, knowing some Spanish will obviously make Venezuela much more interesting to listen to and help you identify YV from other Spanish-speaking countries, on both MW and SW. Taking Spanish classes is, of course, a great idea, but there are other solutions available. For example, you can tune to a strong broadcaster on shortwave like Radio Martí (assuming you have a shortwave radio), and listen to it as much as possible, especially during the top-of-the-hour and half-hour periods.

Another way to learn Spanish on your own is to translate an English web-page using Google translator and compare it with the original English page or, even better, do the reverse. That way, you can see for yourself the mistakes made by word-to-word Spanish-to-English translation.

DXing the Top Twelve

Now we will look at the 12 easiest Venezuelan “estados” in approximate order of reception from northeastern North America, with some notes on European and western North America reception, too. Since I had only logged six states at the time I wrote this article, I combine my own observations with loggings of other well-known DXers such as Mark Connelly (eastern Massachusetts), Barry McLarnon (Ottawa, ON), Dario Monferini (Italy), and Tim Hall (San Diego, California).



DISTRITO FEDERAL

RCR, YVKS, on 750 is probably the most consistent Venezuelan signal in the Montreal area, season after season. They are noted on any average Latin American night during the fall and winter, fighting with co-channel WSB Atlanta. When auroral conditions are strong enough to make WSB disappear, then RCR will be completely dominant. This Venezuelan is running 100 kW. The programming consists mainly of news-talk and sports programs.

The second strongest DF station is YVRQ-910 in Maiquetia, the flagship station of the “AM Center” network which, due to not being on an extremely crowded channel, was regular reception on a car-radio with an omni-directional whip antenna until recently, when a new Cuban “pest” started to up its transmitter power on 910. Still, at least during above-average conditions, they are not too hard to hear, though fighting with the Cuban. Their local slogan – “RQ-910” – has been in constant use since 1986. Before that date, they were known as “Radio Aeropuerto.”

There are two other “Caracaqueños” running 100 kW of power: the flagship of the Mundial network, YVKE, on 550, and Radio Rumbos on 670. Nulling out CHLN-550, you’ll find mainly Venezuelan music with lots of emphasis on Hugo Chavez, the Venezuelan president, as well as news. Because there is also a weaker Miami station using 670 (as received in Montreal) that has anti-Castro programs, the Radio Rebelde transmitter in Arroyo Arenas apparently upped its power, because in WSCR null, it’s usually the only thing clear these days. Every now and then, I hear the popular Noti-Rumbos doorbells underneath, but it’s 95% Rebelde in Montreal these days.

Radio Tiempo, with 50 kW on 1200 kHz, was heard twice here, including once during non-auroral conditions, despite groundwave and short-skip skywave interference from a local Ottawa station! Young Spanish man and ID sneaked through “CFGO The Team” for a few seconds nicely; the other time it was less spectacular because of a pretty intense auroral opening.

If you live in Europe, one of the easiest Venezuelans to hear comes from the Distrito Federal as well. It is Radio Fe y Alegría on 1390 kHz, thanks to the absence of strong stations on adjacent Euro-channels of 1386 and 1395 kHz. European DXers can also hear the Maracaibo station easily on this channel.

FALCON

This state is located on Venezuelan’s north-west coast, although farther east than Maracaibo. The two main cities of this coastal state are Coro and Punto Fijo. Radio Coro, YVNM, on 780, is the second easiest Venezuelan to hear in Montreal, occasionally stronger than even RCR-750. It’s obviously the easiest “Falconiano” to hear in eastern North America and is also pretty easy in Europe. Co-channel WBBM, in Chicago, despite its strength, is very often easily nulled with a directional ferrite bar antenna. I have to tolerate the moderate CJAD-800 splatter which is on the same bearing as Coro from my location in Pierrefonds-Est (barely noticeable when YVNM is really strong). The two main programs you are likely to hear at distance are “La Discoteca del



Pueblo” in the early part of the evening and “Ruta Musical Siete-Ochenta.”

La Discoteca del Pueblo consists of traditional popular Latin American music, birthday greetings to listeners, and religious comments, not just music like the name at first suggests.

“Ruta Musical 7-80” is, on the other hand, a non-stop music program running during the late evening and early morning hours when they don’t carry serious programming. Between each two songs, you’ll hear a time check and an ID, sometimes more, and at the top-of-the-hour an extensive ID announcement. The music played inside the “Ruta Musical 7-80” program ranges from required Venezuelan joropo and gaitas to romantic salsa, reaguetón and Spanish pops.

The two other Coro AM outlets on 660 and 820 are much more difficult, but might be logged with a lot of patience. As for Punto Fijo, a city next to Coro in that same state of Falcón, if you don’t live in Montreal and do not have CINW-940 groundwave as a problem, then Radio Punto Fijo, YVNN, is another good bet, at least during auroral conditions. If WCB is “aurora-ed out,” then YVVM-880 is another Punto Fijan that is really worth trying.

The other Punto Fijo station, on 1150, YVMV, might get here and elsewhere through CJRC/CKOC/WTTT during auroral conditions. Fortunately, when WAMG Boston changed its call-letters to WTTT, it also changed format from Latin tropical music to American news-talk, which will definitely help you identify YVMV.

YVMV is part of the Radio Venezuela network. The easiest outlet of this network to hear from Montreal is YVQT-1110 in the Sucre state during auroral conditions when WBT is weaker or absent. The easiest Falconiano, in both Europe and New Zealand seems to be, by far, YVNV Radio Nacional Antena Popular in Punto Tumatey, a city much smaller than Coro and Punto Fijo. It operates on 1240, an extremely crowded frequency in North America, called a “graveyard” channel by AM DXers for this reason. Even during auroral conditions, several dozen domestic stations in the Southern U.S. not completely absorbed will be causing severe interference, making the 1240 Falconian impossible from NA, unless you live in Newfoundland. Antena Popular is the general service of the public Radio Nacional de Venezuela. As their name implies, they are involved in programming with the widest appeal.

RNV owns four broadcasters: Antena Informativa (mainly news-talk), Canal Clásico (classical music), Antena Popular (popular programming as explained above), and Onda Corta (international service on shortwave), the last one being currently inactive; it is replaced

by a special program aired from Cuba and called “¡Alló Presidente!”

ANZOATEGUI

Located on the northeast coast of Venezuela, the Unión Radio outlet in Puerto-La-Cruz, YVQO, on 640, is your best bet for this state from here in Montreal. WTIC skip blocks YVQT in the state capital of Barcelona (a neighbor which even during auroral conditions seems a very tough catch). Unión Radio has a pretty boring all-news format with very little music, although there are some religious programs and the excellent “Sintonía DX” hosted by the great DXer José Elias Diaz to break the monotony. This station is a difficult catch this season, probably because of the lack of auroral conditions, but it was the strongest Venezuelan and South American at my location during the 2002-2003 DX season.

SUCRE

This is the last Venezuelan state that seems to be relatively easy to receive from Montreal. It is also located on the northeastern coast of Venezuela a bit farther east than Anzoátegui, and it is much bigger than Anzoátegui. (The distance between Cumana and Carúpano, the two biggest cities of Sucre, is around 100 kilometers.) The best bet here is YVQT on 1110 and also the best bet for receiving the Circuito Radio Venezuela network.

While it is located SSE from Montreal, sunset is not the best time of the day to hear them. There are day-timers WUHN, WCEC and WPDZ that make this one really rough at this time. WPDZ is especially problematic, because they also broadcast in Spanish with more or less the same format. You have to listen to very carefully under WBT to get them later in the evening, if you choose this target during non-auroral conditions. Aurora conditions allow YVQT to be easily traced with sometimes fair to good reception. Musical programming consists of typical Latin American music (no reggaeton or Spanish pops), and this station has its share of Venezuelan music like the others nowadays.

The only other Sucre station I heard is YVRZ-1500 “Radio Visión Dos Mil” in late September 2001 on pre-sunset during a great auroral opening that provoked absorption of both WTOP and day-timer WFIF. They had baseball play-by-play at the time (the national sport in Venezuela) with the above-mentioned ID. You might also want to know that YVRZ-1500 is the only South American still possible for Tim Hall in Chula Vista, California, and the strongest Venezuelan in Texas, as well as a regular in both Europe and New Zealand.

Last, but certainly not least, let’s get back from Cumana to Carúpano to approach this state from an European perspective. Radio Vibración on 1470 kHz, an affiliate with Circuito Unión Radio, but mostly with independent music programming, is very often the loudest transatlantic in Europe. I had the chance to hear them using a web-controlled receiver located in Umea, Sweden, back in 2001. When I listened to them they played a very few salsa and Latin dance songs, but mostly folkloric music, probably joropo (though at that time I didn’t know what joropo and llanera were all about, as a newcomer to the world of Latin American music and radio).



ZULIA

Located on the northwestern corner of Venezuela, the capital city here is Maracaibo, which has a very big lake. Aside from the radio stations, this town is reputed to have one of the hottest climates around the country, with maximum temperatures of over 30 °C almost daily. It also has the second biggest lottery. But of most economic importance are the oil reserves, located around Maracaibo Lake, which give Venezuela the second highest standard of living in South America. There are lots of stations to choose from this relatively easy state, although they are not that easy for me in Montreal.

The easiest station here is undoubtedly Radio Maracaibo, YVNC, on 740. I may have heard them, but even with local CKAC-730 nulled and CHWO semi-nulled, I was not able to hear an ID. On the other hand, I once got a fair to poor signal out of Mundial Zulia on 1070. See DISTRITO FEDERAL for more details about the Mundial programming.

For the European DXers, the Zulia state is also pretty easy, thanks to Radio Lumen 2000, YVZC, which is very often reported despite co-channel YVZA in Caracas.

Aside from Maracaibo, another town of DX importance here is Ciudad Ojeda. It does have only one AM broadcaster, but a very interesting one: Radio Petrolina, YVNI, on 1180. When WHAM is weak or absent and you hear a second or third Spanish station on this channel which is not parallel (//) to 600, 670, 710, 5025, et al (Radio Rebelde) nor // 6030 (Radio Marti), it may well be Petrolina. It is a really difficult catch, but a very intriguing target and one of the great challenges the AM broadcast band has to offer you.

NUEVA ESPARTA

This is the Isla Margarita’s state, the area with the most tourists and lots of stations, none of which I have yet identified. The most reported station here seems to be YVQE-720, which is on the same network as YVQT (see SUCRE for details about Radio Venezuela’s programming). I also tentatively logged La Voz del Caribe on 1140 on two or three occasions and got possible Spanish on 1020 (sounded like the YVRS Asunción outlet of the Mundial network) once.

ARAGUA

On March 9, 2001, at 0207 UTC, I was lucky enough to catch very weakly the familiar Noti-Rumbos doorbells as well as a man with “Noti Rumbos Informa” for just a few seconds through WSYR Syracuse, WMCA New York, and Radio Reloj on the very unusual 570! It was heard only once.

On the other hand, I haven’t yet logged the most commonly heard Aragueño, which is Aragueña Seis-Cincuenta (650), YVLH. All I



have heard are WSM Nashville, HJKH, and tentative HIAT, along with the transmitter-produced CKAC-730 local spur. This state is a bit less common than Isla Margarita's Nueva Esparta, which is why it is included behind Nueva Esparta, even though I have not logged that state.

CARABOBO

The capital of this state, Valencia, is located 50 kilometers west of Caracas. The best bet for this state is the Antena Informativa outlet of YVKK, the all news-talk public service broadcaster, which I tentatively got on two occasions, on 770. You might need an aurora to block WABC and to work around QRM from two other Latins, HJJX, and a brand new Cuban Radio Rebelde outlet in order to get this. But if we listen carefully through the interference, we should not have too many difficulties in nailing Antena Informativa down; they are easier than many others, which is why Carabobo is on my Top 12 Venezuelan states list. Antena Informativa is a Radio Nacional de Venezuela broadcaster.

The Valencia station on 810 is not a very bad target, even though it is very seldom reported. But, the most interesting target for this state is Latina, YVJW, on 1470 kHz. To my knowledge, in the past few years it was only logged once from the northeast by a DXer in Toronto. YVJW is a really great challenge for the eastern North American DXers, especially considering 1470 is so crowded with domestics – only slightly less crowded than the local “graveyard” channels.

In Europe, it is not as uncommon to note YVJW mixing with Vibración (YVSY) and sometimes YVJW will rise atop YVSY and the other transatlantics (TAs). Latina mainly hosts talk programs with little if any music, as opposed to Vibración.

Staying with the European DXers for a few moments, let's take a look at the second most important Carabobo city, Puerto Cabello. Puerto Cabello has two great targets: Radio Puerto Cabello, YVLF, on 1290 kHz and Ondas del Mar, YVNG, on 1380. The first one is the best bet for both Europe and North America. Ondas del Mar is extremely rare outside Newfoundland; I only



recall one logging by Mark Connelly during the feeding-frenzy aurora of October 2000 outside the NF DX paradise. In Europe, since France Info from Lille started operating around the clock on the adjacent channel of 1377 a few years ago, Ondas del Mar became extremely difficult there, too. When 1377 was empty on early mornings, YVNG-1380 was a reliable transatlantic catch here.

GUARICO

Enlace 8-60, YVYE, from Villa de Pascua is often reported. It is by far the best bet for this central-north Venezuelan state, even though it is not easy. Another interesting Venezuelan using this channel providing a fairly great challenge is YVOL (see below).

TACHIRA

Situated in western Venezuela in the Andes Mountains, this is a moderately difficult state, but it is reported more often in the National Radio Club's *International DX Digest* and elsewhere than its relative distance from the coast and the mountainous terrain might suggest. This “estado” is especially famous for its lottery, “La Lotería de Táchira,” one of the biggest lotteries in the country with lots of winners.

Until recently, this state was great for pleasant listening on SW, thanks to two relatively high-powered 60 meter broadcasters, Ecos del Torbes on 4980 kHz and Radio Táchira on 4830 kHz. Nowadays, with both of these stations being inactive on SW, you need to get into MW DXing in order to log this wonderful state.

The best bet is undoubtedly Mundial Ocho-Sesenta, YVOL, on 860; it is almost as regularly reported as YVYE. You should be able to null out CJBC out of Toronto, which should be off or absorbed by auroral conditions, and get a shot at both YVYE and YVOL. Otherwise, if you have patience and the desire to listen to Radio Coro, you may be rewarded with sporadic appearances of Ecos del Torbes which share 780 with them – as a reminder of the days when you could easily tune to them on 4980 kHz SW.

I sometimes wonder how these two strong Venezuelans are received in their own backyards. A well-known Iowa DXer visited western Venezuela in late 1994 / early 1995 and was able to hear Radio Coro dominating the frequency on January 3 and also on January 14, despite Ecos del Torbes which was much closer. I imagine the level of interference between the two must be quite high.

BOLIVAR

If you don't have both CKAC-730 and CHWO-740 interfering and/or you are experiencing a great auroral opening during your listening session, then it's worth trying for Radio Caroni, YVNG, on 740. There is also WIAC Puerto Rico, Radio Maracaibo and a Cuban Progreso nearby, so an ID is a “must” before you can add this state in your logbook.

LARA

Llanera harp music comes from the area of this “estado”! This is a state that covers north and central Venezuela, although not the coast. If you live away from CINF's groundwave and

a good Aurora is eliminating their skywave, then your best bet for this state is Radio Barquisimeto, YVMR on 690 kHz. You will have to work around potential interference from other Latin and Caribbean stations like The Caribbean Beacon, XEN, and Radio Recuerdos, HJCZ.

Otherwise, if you live in or pretty close to Montreal with the Barquisimeto's YVMR-690 blocked by CINF and YVMT-730 blocked by CKAC, your best bet would be Radio Cristal, YVXY, on 610 kHz. An apparently new higher power Radio Rebelde outlet, along with HJKL (one of the 33 outlets of Radiodifusora Nacional de Colombia) and YVSE, will make this one very tough even during auroral conditions.

A slightly easier Barquisimeto station is Radio Juventud, YVMY, on 840 kHz, but again, even during a great aurora, you need to listen carefully through Cuban and other Latin signals in order to log them. This is definitely not an easy state to log!

So there they are: the 12 easiest Venezuelan states to log from Montreal. The next 12 are much harder to log and the chances are slim of logging all 24 Bolivarian states, but keep in mind that you're still slightly more likely to hear all the Venezuelan states than all 50 USA states. With this in mind, go after these intriguing Venezuelans on mediumwave!

May good DX be with you!

A note from the author:

My name is Bogdan Alexandru Chiochiiu, son of Aurel Chiochiiu. I'm only 18 years old, but have been involved with radio during most of my life. Since 2000, at age of 13, I have discovered “true DX” on shortwave and mediumwave. I also do FM DXing, especially when there is a good tropospheric ducting or sporadic-E opening.

My first “hard-core DX” experience was in 1996, in Romania, at 9 years old, when I enjoyed tuning to low-powered FM pirates in Bucharest. I knew shortwave for many years, way before beginning elementary school.

I have been a member of the WTFDA, IRCA and NRC. I'm looking forward rejoining the NRC very soon.

I'm currently using for MW, a Sanyo MCD-S830 portable which is excellent, especially on AM. For SW, I use a Sangean CST-818 with a long-wire in our interior yard of about 30 meters.

Since I heard my first Latin American DX in the summer of 2000, Latin America and particularly Venezuela was always my favorite target.



Searching for the Perfect Antenna?

Wouldn't it be great if there was one antenna for all bands and all modes? The problem is that such a hypothetical creature might be a great performer on one or more bands but a dismal performer on others. Of course, the whole idea behind a good antenna is that it transfers the RF energy it collects in the Ether and sends it to your receiver in the most efficient way.

But, there are other considerations, too. The best antenna for some applications may not fit on your property, be allowed by the powers that be, or be affordable. That's why, as radio hobbyists, most of us have to make compromises. Let's look at some optimal antenna and compromise options for all bands.

❖ The Low Bands

The best antenna for receiving the lowest of the low bands, 50-530 kHz, is the Beverage antenna. The key to the Beverage is "the longer the better." The problem is that a really good Beverage needs to be at least one full wavelength long, be laid out in a straight line and about head high. These three requirements rule out most of us on our small lots, in townhouse condos, or apartments. So, what's a radio listener to do?

Why not try a loop?

The small loop antenna is the perfect solution for those really long waves. By making a loop and tuning it to the frequency to which your radio is tuned, you'll get great reception in an impossibly small area. Loop antennas for AM, for instance, measure just about a foot across. They're cheap to buy and easy to build and have the great advantage of being easily rotated to null out more powerful signals nearby. The loop antenna is as old as broadcast radio and was the favorite of your grandfather or great-grandfather (depending on just how old you are!).

It was a perfect match for the new and exciting crystal set, but works



AOR LA350 Shortwave Loop Antenna sells for \$329.95 and has an LW loop option for \$76 more. (Courtesy: Grove/AOR)



Kiwa Medium Wave Loop antenna is a classic work of radio art and is priced accordingly: \$400. (Courtesy: Kiwa)

just as well today with our ultra sensitive solid state radios. Examples of loop antennas (see pictures) show the basic design. Building your own loop is not hard and there are a number of plans readily available on the Web (see resources below).

Don't want to build your own? There are many commercially made loops ranging from the \$59.95 Select-A-Tenna to the \$400.00 Kiwa Medium Wave loop. In between are the \$239.95 AOR LA350 loop and the \$135 Palomar loop. All are widely available, but check out the reviews in back issues of *MT* before you buy. (Many of these reviews are online at www.monitoringtimes.com)

❖ The HF Bands

The term "HF bands" takes in a lot of territory (1.8 to 30 MHz). The higher in frequency you go, the smaller the antennas can be. Antennas at the low end of HF can be really big and antennas in the 28-30 MHz range (10 meters) are surprisingly small.

Is there a one-for-all bands HF antenna? Well, yes and no. For receiving purposes, the Grove tunerless all band antenna, of which I constantly rave, is hard to beat for being sensitive, low noise, easy to build and inexpensive. It's basically an off-center fed dipole and is an excellent receiving antenna from 530 kHz to 30 MHz, making it a great all-around SWL antenna. It's also a very good transmitting antenna from 3.5 MHz through 30 MHz. At 134 feet long it may be too long for attic installations, but it's quite flexible outdoors.

For attic or similar situations where it's more useful to have an end fed antenna, you can build your own or try a number of ready-made wire end-fed antennas. The Par End-Fedz commercially made antenna is one example which gives excellent results. Some of the advantages to all end-fed antennas are that they are more suitable to attic installations and places where it's difficult to run a feed line to the center of the antenna; they make a great portable antenna; and they are excellent stealth antennas when used outdoors.

Par Electronics makes tuned antennas for each of the HF ham bands or a multi-band for 40, 20, and 10 meters. This antenna is only for QRP (10 watts or less) transmitting. An SWL version of this antenna receives from 1-55



The ready-made Par End-Fed Shortwave Listening Antenna is perfect for attic or outdoors in restricted areas. Price \$59.95 from Grove Enterprise. (Courtesy: Grove/Par Antenna)

MHz and is only 44 feet long. The Par SWL antenna is available from Grove Enterprises for \$59.95 (catalog #ANT08).

When you really need a high gain antenna, a simple wire dipole won't cut it. You'll have to put some aluminum in the air. Multi-element beam antennas use aluminum tubing to build an antenna array for extra signal gain and side lobe rejection. The most basic of these is the simple rotatable dipole. Make a regular dipole, only use aluminum tubing instead of wire. For 20 meters, a half-wave dipole will be about 30 feet from tip to tip but a 10 meter dipole will only be about 15 feet, making it a very manageable antenna.

The advantages of the rotatable dipole are that you can peak the signal by rotating it for optimum strength; the single element has a low wind load; and the light weight allows you to mount it on a cheap TV antenna rotator. The chief disadvantage is that, for transmitting purposes, you'll have to put up one for each band you want to work.

Install your rotatable dipole up as high



The CushCraft A3S is a 3 element beam for 10, 15 and 20 meters. Dramatically improves reception and transmitted signal, makes DX chasing a breeze for under \$500. (Courtesy: Universal Electronics)

as you can for even more effectiveness. By adding a "reflector" element behind the dipole and a "director" element in front of it, you will have made a traditional three-element beam!

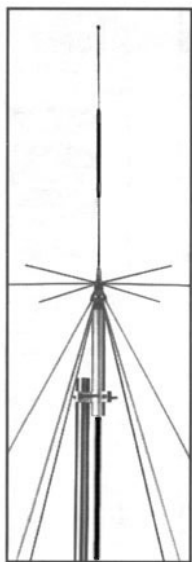
If you live in a place where such structures are allowed and can afford the expense of a tower, you have to consider the Log Periodic Dipole Array (LPDA). This is a multi-element beam antenna (typically 10-12 elements) which provides continuous coverage from 11- 30 MHz. These antennas are top performers and can make your 100 watt rig sound like a kilowatt on the air. But, hold on to your pension fund because they cost from \$1,500 to \$2,000 less shipping! LPDAs are made for the VHF/UHF frequencies, too, and are considerably cheaper (see photo).

There are many other types of beam and wire antennas for the HF bands, far more than I can describe in this limited amount of space. For further information see the resources list below.

❖ Scanner and 2 Meter Antennas

The higher up the frequency chart you get, the more attractive ground plane antennas become. They're cheap, take up little space, are easily mounted, and can receive large chunks of the VHF and UHF bands. The big drawback is that they're omni-directional. If you want to receive Public Service signals from distant cities in a particular direction, you'll need to put up a beam.

Beams do an excellent job bringing in distant signals on either band into your scanner, but if you want to use this type of antenna for ham radio transmitting, you may be disappointed. Antennas designed for scanner use may not be able to take more



Comet DS150S discone omni-directional scanner antenna receives 25-1500 MHz and sells for under \$100. (Courtesy: Universal Electronics)



Create Log Periodic Dipole Array scanner antenna for 105-1300 MHz has amazing gain and side lobe rejection. You'll pay extra for this much performance: \$329.95 retail. (Courtesy: Universal Electronics)

than a few watts input or they may not be as efficient at radiating a signal as they are at receiving. Hams often put up separate antennas for each band they use. They're fairly cheap and are built to take some power. A three-element 2 meter beam, for instance, costs about \$60 and can take up to 500 watts. You may also find that with VHF/UHF beam antennas the gain might overpower your scanner's front end, especially if you live near the targeted metro area. Again, read the reviews in back issues of MT or check out eHam.net.

As you get into the upper reaches of the UHF band, the antennas get smaller and smaller, and it's possible to have a 10 or more element beam for some serious gain. But, the problem here is that signals in the region are truly line-of-sight. There's little "hopping" of signals over the horizon. If you want to expand the receiving distance, you'll need a very tall antenna structure to get the height you need.

For very small antennas, towers are really overkill. You can easily get by with a TV antenna mast from Radio Shack and TV antenna style rotators. But, if there's excessive sway in a moderate breeze you'll need to use a guy system to keep it in place. I've found that by using TV antenna masts fixed to the side of a two-story house, I can get an antenna easily to 30 feet without the use of any guy wires and very little sway, even with a full sized 3 element HF beam at the top. With a set of wall off-sets this is a very inexpensive tower!

Resources:

The ARRL has a number of authoritative reference books on the subject of antennas for HF, VHF and UHF bands. Find out more here:

www.arrl.org/catalog/index.php3?category=Antennas%2C+Transmission+Lines+%26+Propagation

Roll your own loop antenna at this Web page from the Hard-core-DX Web site:

www.hard-core-dx.com/nordicdx/antenna/index.html

Includes details on building a number of interesting loop antennas including the Hula Loop and the K9AY loop.

Build this end fed half-wave wire:
www.qsl.net/oe3mzc/hlfewve.htm

Find out what kind of experiences others have had with a wide range of ham and SWL related gear from antennas to weather stations at eHam.net.
www.eham.net/reviews

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Remote control your Shortwave Receiver, Scanner, or ICOM Transceiver from your easy chair with the SWL IR Remote and a Universal TV Remote control.

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- ♦ SWL IR Remote for ICOM IC-R75 \$79.95
- ♦ SWL IR Remote for JRC NRD-535 \$89.95
- ♦ SWL IR Remote for Lowe HF-150, HF-225 \$79.95
- ♦ SWL IR Remote for Kenwood R-5000 \$79.95
- ♦ SWL IR Remote for Uniden Scanners ... \$89.95

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The Par EF-SWL is an end-fed short wave antenna optimally designed for 1-30 MHz reception. The radiator is 45 feet of genuine #14 gauge black polyethylene coated Flex-Weave wire (168 strands of #36 gauge woven copper). This material is very strong yet can easily be coiled like a rope for portable work. The UV resistant matchbox houses a wideband 9:1 transformer wound on a binocular core. Unlike other transformers, external stainless studs on the matchbox allow the user to configure the primary and secondary grounds for best noise reduction at their particular location. Output is via a silver/teflon SO239 connector.

Par EF-SWL Order #2205 \$57.95

Universal also carries the Par MON3 omni VHF-UHF base antenna and Par RF filters.

Note: Orders under \$100 ship UPS for only \$6.95.



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Kevin Carey

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Q. *I want to use one discone antenna with my scanner and also my two-meter transceiver. Can I do this with a simple splitter, or do I need a multiplexer? And what coax should I use for a 100 foot run? (Brock Gorman KC2LAH)*

A. Splitters simply divide a signal into two paths. This works great for two receivers, but if one is a transmitter, the isolation isn't good enough to protect the attached receiver when the other rig is transmitting.

That's where a multiplexer comes in; it also provides the split, but it does it with a tuned circuit which blocks damaging RF voltage from entering the receiver.

So far as the coax choice, you have several. Since it's 100 feet long and at 148 MHz, DON'T use RG-58/U. You can use foam-dielectric RG-8/U or mini-RG-8, also called RG-8X. You can also use RG-6/U outdoor-TV cable which isn't an exact impedance match, but the loss is negligible. Be sure that you have proper connectors to fit your choice.

Q. *What are the advantages to using coax feedline on a random-length receiving antenna? (Robert Steckbeck, Manheim, PA)*

A. There are two: Shielding from electrically-noisy environments (AC lines and electronic/electrical accessories near the feedline), and the ability to run the line along metal surfaces or even underground without signal loss from capacitive absorption.

Q. *Do I have to use all of the elements on a Diamond wideband discone antenna if I'm only going to be listening to the 154-155 MHz range? (Scott, email)*

A. The quick answer is no. You can eliminate the top vertical which is the low-band resonator (40-50 MHz range). However, if you use only one short disk radial (an upper spoke) and one longer sloping radial beneath it, the antenna may exhibit some unpredictable directivity and a poor impedance match. I'd use all of the disc elements and sloping radials. If you can't, then put in at least four pairs (upper and lower) evenly spaced (every 90 degrees).

Q. *Although the Grove Omni II*

scanner antenna is advertised as being omnidirectional, doesn't the fact that it is mounted alongside a metal mast make it directional? (Jim Ashe, Clearwater, FL)

A. Yes; while the antenna itself is non-directional, a metal mast within 1/4 wavelength of an antenna is reflective and imposes a directional effect. As to what the effect will be (enhancing, canceling, or nothing at all) depends upon the frequency (because of the spacing of the element from the mast pipe) and the angle of the arrival of the signal.

Because the boom spaces the elements from the mast by about 18", there will be some directional effect on VHF high band (around 150-160 MHz). The resulting gain is only about 2-3 dB at best in the forward direction, which doesn't mean much. Any substantial signal cancellations (nulls) from the sides will be very sharp, so the general reception 360 degrees around is still mostly non-directional.

While we have sold thousands of these antennas with virtually no comments about directivity, you can always mount it in such a manner that the antenna faces the most critical, distant target on VHF-high, then listen for weak signals off the sides and back to be sure that they haven't become attenuated. You can then rotate the antenna around a little, checking relative signal strengths, then leave it at the optimum position.

Q. *Some FM broadcast stations don't regularly identify themselves on a regular basis; is this a violation of the FCC Rules and Regulations? Or have they just caught on to the laxity of enforcement? (Judy May, W1OR0, Union, Kentucky)*

A. In the U.S., FM broadcasters must identify with their call letters and community at the beginning and ending of the broadcasting day, and as close to every hour as practical during a logical programming break. I suspect there is some laxity among some broadcasters, especially if they are long-time licensees and there's little doubt as to who they are! Nonetheless, I'm sure it's punishable if it is confirmed by the FCC.

Q. *I was listening on my scanner to a nearby police dispatcher doing license checks. Among the information read over the air were people's social security numbers,*

dates of birth and physical descriptions. If someone overhears this information and uses it for identity theft, what is the liability of the police agency that revealed it? (Lou Johnson, Atlanta, GA)

A. Good point; police agencies have revealed to scanner listeners this sort of information for decades. The immediate protection is federal law (1934 Communications Act, amended) which forbids the use of any information overheard by any eavesdropper. But this doesn't stop lawbreakers. Perhaps some of our law enforcement and legal professionals among our MT readership have some thoughts on this one!

Q. *I'd like to connect either an active antenna or large outdoor antenna to my shortwave portable, but I'm afraid of overloading the radio. Can I simply put a 5,000 ohm carbon potentiometer between the radio's antenna terminal and the incoming coax line? (Doug Chandler, email)*

A. Yes, but I'd suggest a much lower resistance – say, 100-500 ohms or so. The reason for this is that the line impedance is going to be around 50 ohms, and I suspect that the high-resistance pot would be very "touchy" to tune – you wouldn't be using much of the rotation.

Q. *I have a ground-plane scanner antenna mounted atop a metal mastpipe. Can I mount an active shortwave antenna like the popular Skymatch on the same mast? (Norm Miller)*

A. Yes, you certainly can mount an active antenna like the H800 or H900 on the same mast, but I would recommend a stand-off boom of a few inches (maybe a foot?) just to reduce the capacitive absorptive/reflective effects of having the whip right alongside the metal mast pipe.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. Mail your questions along with a self-addressed stamped envelope in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.)

Q. Who is going to be using the 700 MHz band and why? Bret Erickson via email

A. It seemed appropriate to revisit Bret's question, originally run in this column in the February 2006 issue of MT. Since the public, media and government discourse continues to swirl around this new public safety band, I want to add the latest information about what is happening in this band.

In 1998, the Federal Communications Commission (FCC) adopted service rules for the 24 megahertz of spectrum in the 764-776/794-806 MHz frequency bands (collectively, the 700 MHz public safety band). Channel spacing here is 12.5-kHz spacing. At the direction of Congress, this spectrum was reallocated from television broadcast services to public safety communications services for general use by local, regional and state users. It will be available as soon as existing TV stations vacate the spectrum. Congress has recently set the hard date for DTV conversion and the rebanding of TV stations in this band to be February 17, 2009.

The FCC designated approximately 10 percent (2.6 MHz) of the 700 MHz public safety spectrum for nationwide interoperable communications. The FCC determined that administration of the Interoperability channels should occur at the state level, either by a State Interoperability Executive Committee (SIEC) or an existing equivalent agency. Interoperability is defined as the ability of different governmental agencies to communicate across jurisdictions and with each other.

And just when you thought the public safety spectrum grab was over, have you heard about the 4.9 GHz band reserved by the FCC for communications between first responders at emergencies? The 4.9 GHz public safety band has been allocated to public safety for broadband technologies. Communications must be related to the protection of life, health or property. Examples of types of uses are:

- Wireless LANS for incident scene management
- Mobile data
- Video security
- VoIP
- PDA connectivity
- Hotspots
- T1 line replacement (permanent fixed point-to-point operations are secondary to base mobile and temporary fixed operations)

Q. I have a question about the proposal to drop the Morse code requirement for ham radio licenses. I have not been able to find any information on what the outcome of the FCC proposal has been. Was it adopted or rejected? I have started to study for my general license and I am interested in knowing if I still need to learn Morse code for the license. Bill Maquet, N7SZC

A. The American Radio Relay League (ARRL) recently released a bulletin to the amateur radio community that sums up what we currently know

about the no-code proceedings before the FCC. From their bulletin we quote:

"Just when the FCC will act on the 'Morse code' proceeding, WT Docket 05-235, remains hazy. The Commission released a Notice of Proposed Rule Making and Order (NPRM&O) last July proposing to eliminate the Element 1 (5 WPM) Morse code requirement for all license classes."

"The next – and most-anticipated – step for the Commission is to formally adopt any revisions to its rules and conclude the proceeding with a Report and Order (R&O) that spells out the changes and specifies their effective date.

"There really is no news," an FCC Wireless Telecommunications Bureau (WTB) staffer told ARRL... "We certainly hope to release WT Docket 05-235 sometime this year, but we're not making any predictions at this time." The WTB staffer indicated there would be no 'big announcements' at the Dayton Hamvention FCC Forum either...

"Any FCC decision to eliminate the 5 WPM Morse code requirement for HF access would have no impact on either the current HF CW-only sub-

bands or on the CW privileges of Amateur Radio licensees."

Q. What is the 1711-1799 kHz band used for? As a practical matter, is it really used at all in North America? Government publications list it for radiolocation but I haven't heard anything there for many years. Steve Green, San Diego, California

A. As Steve points out, this band does not appear to be in wide use. In ITU Region 2 the band is allocated for aeronautical radio navigation, fixed and mobile radio services, and radiolocation. To see what is licensed here in the United States, Table One shows the allocations listed by the FCC. (Note: RL is an abbreviation for Radiolocation.)

While not heavily populated, most of the signals in this band are probably aimed offshore or to nearby coastal waters and would not propagate well inland.

And that does it for this month. Until next time 73 and good hunting.

TABLE ONE: 1711-1799 FCC ALLOCATIONS

1705.0	KVC59	Cook Inlet Pipeline Co	Kenai, AK	Alaska Private
	WBH84	Kevin O'Leary	Kodiak, AK	Alaska Private
	WPXC758	NorQuest Seafoods	Ketchikan, AK	Alaska Private
1709.0	WDH61	Icicle Seafoods Inc	Petersburg, AK	Alaska Private
	WPXC758	NorQuest Seafoods	Ketchikan, AK	Alaska Private
1710.8	WNZG604	Cochrane Technologies	Pacific Coast Areas	RL-Temporary
	WNZG605	Cochrane Technologies	Atlantic Coast Areas	RL-Temporary
	WNZZ248	Cochrane Technologies	Great Lakes Region US	RL-Temporary
	WNZZ249	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1712.0	KMD53	John Fulton	Dillingham, AK	Alaska Private
1714.0	KNNN982	Racal NCS Inc	Port Hueneme, CA	RL-Land
	KNNN982	Racal NCS Inc	Pensacola, FL	RL-Land
	KNNN982	Racal NCS Inc	Boothville, LA	RL-Land
	KNNN982	Racal NCS Inc	Gilchrist, TX	RL-Land
1715.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1716.0	KNNN982	Racal NCS Inc	Port Hueneme, CA	RL-Land
	RS KNNN982	Racal NCS Inc	Pensacola, FL	RL-Land
	RS KNNN982	Racal NCS Inc	Boothville, LA	RL-Land
	RS KNNN982	Racal NCS Inc	Gilchrist, TX	RL-Land
1720.8	WNZG604	Cochrane Technologies	Pacific Coast Areas	RL-Temporary
	WNZG605	Cochrane Technologies	Atlantic Coast Areas	RL-Temporary
	WNZZ248	Cochrane Technologies	Great Lakes Region US	RL-Temporary
	WNZZ249	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1725.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1730.8	WNZG604	Cochrane Technologies	Pacific Coast Areas	RL-Temporary
	WNZG605	Cochrane Technologies	Atlantic Coast Areas	RL-Temporary
	WNZZ248	Cochrane Technologies	Great Lakes Region US	RL-Temporary
	WNZZ249	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1735.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1740.8	WNZG604	Cochrane Technologies	Pacific Coast Areas	RL-Temporary
	WNZG605	Cochrane Technologies	Atlantic Coast Areas	RL-Temporary
	WNZZ248	Cochrane Technologies	Great Lakes Region US	RL-Temporary
	WNZZ249	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1742.0	WPST448	Racal NCS Inc	Offshore Waters	RL-Temporary/Mobile
1744.0	WPST448	Racal NCS Inc	Offshore Waters	RL-Temporary/Mobile
1745.0	WQBW612	Subsea 7 LLC	Venice, LA	Business Data Signal
1745.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1746.0	WPST448	Racal NCS Inc	Offshore Waters	RL-Temporary/Mobile
1750.0	KNCW611	WesternGeco L.L.C.	Temporary Nationwide	RL-Temporary/Mobile
1750.8	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1755.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1757.0	KNCW611	WesternGeco L.L.C.	Temporary Nationwide	RL-Temporary/Mobile
1760.8	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1765.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1766.0	KNCW611	WesternGeco L.L.C.	Temporary Nationwide	RL-Temporary/Mobile
1770.0	KNCW611	WesternGeco L.L.C.	Temporary Nationwide	RL-Temporary/Mobile
1770.8	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1775.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1780.8	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary
1785.8	WPHW222	Cochrane Technologies	Gulf and Offshore Waters	RL-Temporary
1790.8	WPAP201	Racal NCS Inc	Gulf and Offshore Waters	RL-Temporary

Scanning in Illinois and Nevada

The need for interoperability has pushed many states toward large, interconnected radio networks. Some states, like Michigan and South Dakota, have chosen to fund and build new statewide networks from the ground up. This month we'll take a look at two states, Illinois and Nevada, which are improving their interoperability by taking a different path.

ILLINOIS

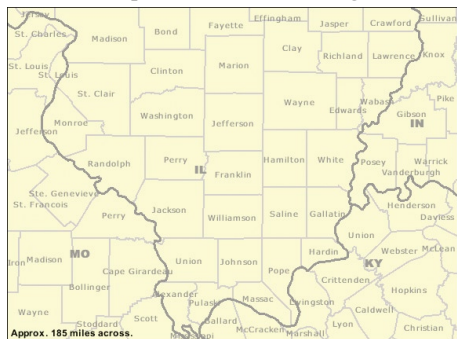
Dan,

I read with great interest last night your sections on trunk track scanning and thank you for your great article. I've re-read it today to get a better understanding and each time it becomes a little more clear.

I live in Southern Illinois (Franklin County to be exact) and recently purchased a Radio Shack PRO-2055. I've wondered if it would be an advantage to upgrade to the PRO-2096, however, given my area. Here is why, and you'll quickly recognize how green I am at this.

I notice that the 2055 appears to support EDACS, Motorola, and LTR trunking. The PRO-2096, however, supports APCO instead of LTR, which appears to be what is being used by the Illinois State Police and Marion Penitentiary (both of which interest me). I am taking my information from the Radioreference.com site under RRDATABASE for Southern Illinois. Furthermore, although I'm not sure it is needed, the 2096 I believe supports digital, which seems to be the future. Finally I stumbled across this issue of rebanding and there is indication that the 2096 will support this and the 2055 might/might not.

The flip side is that most of the coverage for the area appears to actually be either conventional or supported by the 2055, although I'm still not quite sure about the digital issue.



I guess I'd like your help, especially suggestions as to these matters and whether our area is sufficiently covered by the 2055, i.e., about whether I'm going to actually get the great majority of my coverage by using a 2055.

I really liked your comparisons of the models, but there were no articles of review like so many of the Uniden models were on your site.

— Jay in Southern Illinois

GRE America manufactures both of the scanners you mention for Radio Shack, so their user interface features are understandably similar. The PRO-2055 (the base/mobile version of the PRO-97 handheld) includes the Military Air band (225-400 MHz) where the PRO-2096 does not. The PRO-2055 also offers the "Signal Stalker II" technology.

The PRO-2096 (the base/mobile version of the PRO-96 handheld) is able to track and monitor APCO Project 25 digital systems, including those using the APCO trunking standard (often referred to as 9600-baud control channels). It also offers the Virtual Scanner feature, making programming quite a bit easier. As Jay notes, it does not support Logic Trunked Radio (LTR) systems, and lacks coverage in the Military Air band.

Franklin County, Illinois

Franklin County is a largely rural area in southern Illinois with about 40,000 residents. The county seat is Benton, which has the dubious distinction of being the site of Illinois' last public hanging back in 1926. Beatles fans may know it better as the one-time home of George Harrison's sister Louise (her house on McCann Street is now *the Hard Day's Nite Bed and Breakfast*).

For scanner fans, the Franklin County Central Dispatch operates on the following frequencies:

Frequency Description

154.070	County Fire Dispatch and Paging
154.265	Interagency Fire Emergency Radio Network (IFERN)
154.445	County Fire Dispatch
154.815	Central Dispatch (West)
154.995	Sheriff Dispatch
155.025	Emergency Services Mutual Aid Radio Network (ESMARN)
155.730	Central Dispatch
155.805	County Emergency Medical Ser-

vices

158.730	County Government Services
453.200	County Highway Department

Local police departments in the county can be heard on:

Frequency Description

155.490	Benton Police (Dispatch)
154.800	Benton Police
155.130	West Frankfort Police (Dispatch)
154.725	West City Police

Illinois State Police

District 13 of the Illinois State Police is headquartered in the town of DuQuoin and serves Franklin, Jackson, Jefferson, Perry, Randolph, Washington and Williamson Counties. You should be able to monitor the following VHF and UHF frequencies:

Frequency Description

39.46	Statewide Point-to-Point
42.50	Statewide Car-to-Car
42.56	Dispatch (Alternate)
42.60	Dispatch
154.935	Dispatch
155.055	Illinois Radio Emergency Assistance Channel (IREACH)
155.370	Statewide Point-to-Point
155.460	Fairgrounds (& to other District bases - Collinsville, Springfield)
155.475	Illinois State Police Emergency Radio Network (ISPERN)
855.4625	Illinois Criminal Justice Information Authority

The ISPERN and IREACH frequencies have been in operation for quite some time and are a simple but relatively effective way to provide basic interoperability between agencies. By setting aside known frequencies across the



state and specifying what they should be used for, any radio capable of receiving on these frequencies could be kept informed during an emergency.

IREACH has been used for more than two decades, allowing any public safety employee to talk to any other public safety employee via radio when no other direct means of communication is available. The FCC has set aside frequency of 155.055 MHz in Illinois for this purpose. It allows users from different agencies to communicate directly when requesting mutual aid or working multi-jurisdictional events. Although it is intended for mobile-to-mobile conversations, base stations may also be licensed to use the frequency. All transmissions are analog voice, and paging or other selective signaling is specifically disallowed.

ISPERN is available in nearly every police vehicle. It's used for emergency law enforcement broadcasts, providing alert information about serious crimes that have just occurred. It is often used for reporting and coordinating high speed pursuits that cross law enforcement jurisdictions.

IFERN on 154.265 MHz was designated as the statewide mutual aid channel for fire operations back in 2001. In addition, a series of "colors" have been established for various fireground frequencies:

Color	Frequency
Red	153.830
Blue	154.295
White	154.280
Green	150.790 (unofficial)
Black	154.2725
Gray	154.2875
Gold	153.8375

STARCOM21

STARCOM21 is a statewide radio network being installed for the use of state and local government agencies. It is built, owned, maintained and operated by Motorola on behalf of the State of Illinois. When it is finally complete and activated, public safety agencies will pay Motorola a monthly fee to use the STARCOM21 system, based on how much they use the system. This pay-for-use scheme will relieve the individual agencies from having to equip and update their own radio systems. Essentially, Illinois is outsourcing their public safety radio needs.

STARCOM21 will be a fully digital APCO Project 25 network, designed for operation on 700 MHz and 800 MHz frequencies. This means that a newer digital-capable scanner will be needed to monitor the system. Specific to Jay's letter, the PRO-2096 will be able to track and monitor STARCOM21 transmissions. However, the PRO-2055, because it lacks digital capability, will not be able to do so.

The system is divided into three main zones: North is centered in Downers Grove; Central is headquartered in the state capital of Springfield; and South is out of Collinsville. A total of 187 repeater sites across the state are planned, with projected mobile geographic coverage of 95%. Most of the sites south of Interstate 80 are essentially complete. A number

of sites in the North zone are still waiting on lease agreements or site construction but are expected to be complete by this fall.

Motorola is expecting the STARCOM21 system to be "complete and available for operational use" by the end of 2006.

Table 1 is a list of tower locations and associated frequencies that are within the boundaries of the Illinois State Police District 13. Note that these sites may not yet be active, since testing and optimization will continue for the remainder of the year.

TABLE 1: STARCOM 21 District 13 Repeater Sites

County	Town	Frequencies
Franklin	Thompsonville	867.8750, 868.4000, 868.8875
Jackson	Cora	866.3500, 866.8750, 867.4000, 867.9250
Jackson	Makanda	866.3375, 866.8625, 867.3875, 867.9125
Jefferson	Bluford	867.4250, 867.4500, 868.4750
Jefferson	Mount Vernon	866.4000, 866.9250, 867.4500, 867.9750, 868.8625
Perry	DuQuoin	866.9125, 867.4375, 867.9625
Perry	Gorham	866.4750, 867.3125, 867.8375, 868.3625
Randolph	Chester	866.3250, 866.8500, 867.3750, 867.9000
Randolph	Evansville	866.4125, 866.9375

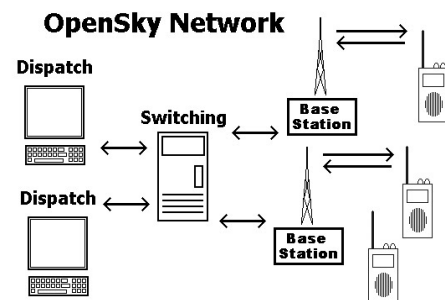
In 2004 the Illinois Terrorism Task Force (ITTF) offered to provide a STARCOM21 radio to every police, fire, emergency medical, and public health agency, as well as dispatch centers. The radio, along with five years of airtime, was offered at no charge to each agency. The idea was to provide a basic level of communication interoperability through the establishment of an "ITTF Announcement" talkgroup. With the free radio, each agency would be able to monitor event notifications, participate in exercises, and allow communication during incidents. A total of 356 mobiles, 33 portables and 252 STARCOM 21 base stations were purchased by the ITTF, at a cost of about \$3.9 million. These radios are in the process of being distributed and installed, and may even be operational in some areas in advance of the system completion date.

The ITTF also offered the use of a VHF radio to each agency, programmed with the following frequencies:

Frequency	Name
155.0550	IREACH
155.7250	V-CALL
151.1375	V-TAC-1
154.4525	V-TAC-2
158.7375	V-TAC-3
159.4725	V-TAC-4
155.4750	ISPERN

Each of these frequencies is operated *simplex*, meaning that each radio takes turns transmitting and receiving on the same frequency. Five hundred of these radios, nicely packaged in a Pelican case with a magnetic-mount antenna and cigarette lighter power cord, have been distributed to the requesting agencies. With the common frequencies pre-programmed, a responding officer can simply hook up the unit to the squad car and begin communicating.

As far as a scanner recommendation for Jay, it appears that the PRO-2055 will do a fine job for most of the public safety activity in his area. However, if and when Franklin County and other local agencies decide to join the STARCOM21 system, or when the Illinois State Police in District 13 finally move to the



800 MHz digital system and turn off their VHF and UHF radios, it would be time to consider a scanner upgrade. Those changes may take a fair amount of time to occur, so there is certainly no hurry for Jay to trade in his PRO-2055 for a PRO-2096.

NEVADA

Another state working to put together a comprehensive radio network is Nevada.

Las Vegas

In February the city of Las Vegas awarded

TABLE 2: Nevada Statewide EDACS System (partial list)

Repeater Location	Frequencies (in LCN order, starting with 01)
Amargosa Valley	856.2625, 857.2625, 858.2625
Angel Peak	856.4625, 857.4625, 858.4625
Austin	856.9625, 857.9625, 858.9625
Baker	856.2625, 857.2625, 858.2625
Battle Mountain (East 1)	858.7125, 859.7125, 860.7125
Battle Mountain (East 2)	856.9375, 857.9375, 858.9375
Battle Mountain (West)	855.2125, 856.2125, 857.2125
Beatty	855.7375, 856.7375, 857.7375
Carlin (East)	856.7125, 857.7125, 858.7125, 859.7125
Carlin (West)	856.4625, 857.4625, 858.4625
Carson City	856.9625, 857.9625, 858.9625, 859.9625, 859.9625
Carvers	856.7125, 857.7125, 858.7125, 859.7125
Clark County (North)	866.0750, 866.4250, 866.8250, 867.2000, 867.4250, 868.1000, 868.3625, 868.6250
Clark County (South)	866.2250, 866.7000, 867.7500, 868.1625, 868.7125
Crystal	856.9375, 857.9375, 858.9375, 859.9625
Current	858.2125, 859.2125, 860.2125
Currie	858.2125, 859.2125, 860.2125
Dayton	856.7125, 857.7125, 858.7125
Denio	858.2125, 859.2125, 860.2125
Elko (West)	855.2125, 856.2125, 858.2125
Ely (East)	856.7125, 857.7125, 858.7125
Ely (West)	856.7375, 857.7375, 858.7375
Eureka (Central)	855.7375, 856.7375, 857.7375
Eureka (East)	856.7125, 857.7125, 858.7125
Eureka (West)	855.2125, 856.2125, 857.2125
Eagle Mountain	856.4375, 857.4375, 858.4375
Eagle Ridge	854.9875, 856.7625, 858.7625
Elko	856.9625, 857.9625, 858.9625
Elko (North)	855.2125, 856.2125, 857.2125, 858.4625
Fallon	855.7375, 856.9375, 859.2125
Glendale	855.2125, 857.2625, 857.7125, 858.7125
Golconda	856.2625, 857.2625, 858.2625
Goldfield	856.4625, 857.4625, 858.4625
Hawthorne	856.9375, 857.9375, 858.9375
Hawthorne (West)	858.2125, 859.2125, 860.2125
Jean	866.2250, 866.7000, 867.7500, 868.1625
Lamoille	854.9625, 855.9625, 856.7625, 857.7625
Las Vegas	854.9625, 855.4625, 855.9875, 856.4875, 857.2125, 858.2125, 859.2125, 859.7125, 860.2125, 860.7125, 856.2375, 856.9625, 858.4375, 859.4375, 860.9625
Laughlin	866.2875, 866.8750, 867.3250, 868.2375, 868.5250, 868.8000
Lida	856.9625, 857.9625, 858.9625
Lovelock	858.2125, 859.2125, 860.2125
Mina (East)	856.2625, 857.2625, 858.2625
Mina (West)	856.7125, 857.7125, 858.7125
New Pass	856.4625, 857.4625, 858.4625, 859.4625
North Las Vegas	856.7375, 857.7375, 858.7375, 859.7375, 860.7375
Oasis	856.2625, 857.2625, 858.2625
Pahrump	856.9625, 857.7125, 858.7125
Patrick	856.4375, 856.7125, 857.4375, 857.7125,

Peavine	858.7125
Pioche (East)	855.4625, 856.4875, 858.4375
Pioche (North)	856.9625, 857.9625, 858.9625
Primm	855.2125, 856.2125, 857.2125
Rachel	866.0750, 866.4250, 866.8250, 867.4250, 868.1000, 868.6250
Round Mountain	855.2125, 856.2125, 857.2125
Ruby Lake	856.7125, 857.7125, 858.7125
Red Peak	855.4875, 858.2125, 859.2125, 860.2125
Slide Mountain	855.9875, 859.4375, 860.9625
Sloan	855.2125, 857.2125, 858.7125, 859.7125, 860.2375, 866.2875, 866.8750, 868.2375, 868.5250
Tahoe City	856.7125, 857.7125, 858.7125
Tonopah	856.7375, 857.7375, 858.7375, 859.7375
Toulon Peak	858.2125, 859.2125, 860.2125
Virginia Peak	855.7375, 856.7375, 860.4375
Warm Springs	856.9375, 857.9375, 858.9375
Wells	856.4625, 857.4625, 858.4625
West Wendover	855.2125, 856.2125, 857.2125

There are also sites in the neighboring states of California (CA) and Utah (UT), including the following:

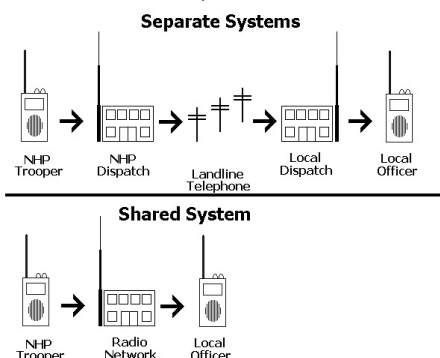
Winnemucca	856.4625, 857.4625, 858.4625
Homewood (CA)	856.4625, 857.4625, 858.4625
Olympic Valley (CA)	856.2375, 856.9625, 857.9625
Portola (CA)	857.9625, 858.9625, 859.9625
South Lake Tahoe (CA)	855.7375, 856.7375, 857.7375
Truckee (CA)	856.7125, 857.7125, 858.7125
Saint George (UT)	856.4625, 857.4625, 858.4625

a \$8.9 million contract to M/A-COM to build an OpenSky radio network for the Metropolitan Police Department. The new system would handle the voice and data needs of MPD's 2,000 officers, and may eventually expand to serve 12,000 users from other agencies. This is bad news for scanner listeners, since there is no consumer-level equipment available that can monitor OpenSky transmissions. Although OpenSky does not use the APCO Project 25 standards, the contract calls for network interface gateways to surrounding public safety agencies for interoperability.

One such gateway would be to the Nevada Shared Radio System (NSRS). NSRS is a statewide network operated by a public-private partnership that includes the Nevada Highway Patrol (NHP), Nevada Department of Transportation (NDOT), Nevada Power (NPC) and Sierra Pacific Power (SPP).

In 1996, Nevada Power teamed with NDOT to establish a statewide radio network. With much of state being sparsely populated, it made sense to combine state and private resources to create a radio network that both parties could share.

In late 2003 the Highway Patrol was legally required to abandon their existing \$14 million VHF radio system, purchased in 1996 and installed in 2000, when it was discovered



that they didn't have the proper FCC licenses for the 140 frequencies they were using. To fix this incredible bureaucratic oversight, the state legislature allocated \$15 million for the NHP to join the NSRS. Sierra Pacific worked to transition NHP from their 150 MHz frequencies to the 800 MHz system. This transition was complete by the end of 2004.

However, even with the NHP on 800 MHz, they continue to have difficulty communicating directly with local sheriffs' departments, who still use 150 MHz radio systems. Until new radios are available, messages have to flow through dispatch centers, making interoperability much more difficult and time-consuming.

As you might expect, a statewide system for Nevada is large and complicated. The first thing to note is that it is an EDACS (Enhanced Digital Access Communications System) network, so the frequencies must be entered into your scanner in Logical Channel Number (LCN) order. Also, despite the name, transmissions on the system are analog, not digital.

Note that the frequency list in Table Two is incomplete and many frequencies have not been completely verified. We need more scanner listeners in Nevada, especially in more rural areas. Updates are welcome!

EDACS systems identify talkgroups using an Agency-Fleet-Subfleet (AFS) format. They appear on your scanner as two numbers separated by a dash. The first two digits are the Agency, and the NSPS appears to use the following codes:

Agency Description

05	Highway Patrol
06	Department of Transportation
07	Sierra Pacific Power
08	Nevada Power
11	University of Nevada, Las Vegas (UNLV)

The Fleet and Subfleet are combined into a single three-digit number appearing to the right of the dash.

Nevada Highway Patrol

Decimal	AFS	Description
652	05-014	Car-to-Car
653	05-015	Car-to-Car
660	05-024	State Parks
721	05-101	Elko
737	05-121	Las Vegas (North)
738	05-122	Las Vegas (South)
739	05-123	Las Vegas
740	05-124	Las Vegas
741	05-125	Las Vegas Tactical 1 (North)
742	05-126	Las Vegas Tactical 2 (South)
743	05-127	Las Vegas Tactical 3
744	05-130	Las Vegas Tactical 4 (Traffic)
753	05-141	Reno 1
754	05-142	Reno 2
755	05-143	Reno 3
756	05-144	Reno 4
757	05-145	Reno Tactical 1
758	05-146	Reno Tactical 2
759	05-147	Reno Tactical 3

Nevada Department of Transportation (NDOT)

Decimal	AFS	Description
785	06-021	Las Vegas
786	06-022	Las Vegas
788	06-024	Mount Charleston
793	06-031	Searchlight
794	06-032	Mountain Springs
796	06-034	Alamo
797	06-035	Glendale
798	06-036	Panaca
888	06-150	Highway Call Boxes

Sierra Pacific Power

Decimal	AFS	Description
913	07-021	System
914	07-022	Dispatch
915	07-023	Reno
916	07-024	Transmission
920	07-030	Construction
921	07-031	Construction
922	07-032	Safety and Training
924	07-034	Telecommunications
925	07-035	Tree Trimming
926	07-036	Wire Pull
927	07-037	Storm
929	07-041	Security
930	07-042	Administration
931	07-043	Information Services
932	07-044	Facilities
933	07-045	Fleet Services
936	07-050	Fraud Investigation
937	07-051	Surveying
943	07-057	Storm 2
947	07-063	Construction
961	07-081	System
962	07-082	Yerington
963	07-083	Hawthorne
964	07-084	Tonopah
965	07-085	Lovelock
966	07-086	Winnemucca
967	07-087	Battle Mountain
968	07-090	Elko
969	07-091	Fallon
970	07-092	Lake Tahoe (South)
971	07-093	Lake Tahoe (North)
972	07-094	Carson Electric
973	07-095	Portola
975	07-097	Storm 3

Nevada Power

Decimal	AFS	Description
1057	08-041	Meter Readers
1082	08-072	Laughlin
1089	08-081	Distribution
1130	08-132	Trouble
1131	08-133	Repair
1137	08-141	Meter Readers

University of Nevada, Las Vegas (UNLV)

Decimal	AFS	Description
1417	11-011	Technicians
1433	11-031	Maintenance
1441	11-041	Grounds
1469	11-075	Operations
1481	11-091	Police (Dispatch)
1489	11-101	Parking

That's all for this month. I welcome your electronic mail about statewide networks or any other radio topic at danveeneman@monitoringtimes.com, and as always more information is available on my website at www.signalharbor.com. Until next month, happy monitoring!

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When you buy your Bearcat 796DGV TrunkTracker package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC796DGV scanner purchase, you also get a **free deluxe scanner headphone** designed for home or race track use. Headset features independent volume controls and 3.5 mm gold right angle plug. The 1,000 channel Bearcat 796DGV is packed with features to track Motorola Type I/II/III Hybrid, EDACS, LTR Analog Trunk Systems and Motorola APCO 25 Phase I digital scanner including 9,600 Baud C4FM and CQPSK. Also features control channel only mode to allow you to automatically trunk many systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control and programming with RS232C 9 pin port (cable not supplied), Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for \$29.95. For complete details, download the owners manual from the www.usascan.com web site. For fastest delivery, order on-line at www.usascan.com.

Bearcat® BCT8 Trunk Tracker III

Manufacturer suggested list price \$299.95

CEI Special Price \$169.95

250 Channels • 5 banks • PC Programmable
Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25,000-54,000 MHz., 108,000-174,000 MHz., 400,000-512,000 MHz., 806,000-956,000 MHz., 849,0125-868,9950 MHz., 894,0125-956,000 MHz.

The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner. Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies. Preprogrammed service searches makes finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches. The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving. The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket. For maximum scanning enjoyment, also order the following optional accessories: External speaker ESP20 with mounting bracket & 10 feet of cable with plug attached \$19.95. Magnetic Mount mobile antenna ANTMMBNC for \$29.95.



Bearcat® BCD396T Trunk Tracker IV

Suggested list price \$799.95/CEI price \$519.95

APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

25,000-512,000 MHz., 764,000-775,9875 MHz., 794,000-823,9875 MHz., 849,0125-868,9765 MHz., 894,0125-956,000 MHz., 1240,000 MHz - 1300,000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning.

Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. **Dynamically Allocated Channel Memory** - The BCD396T scanner's memory is organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but **over 6,000 channels are possible** depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. **Preprogrammed Systems** - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. **3 AA NiMH or Alkaline battery operation and Charger** - 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAh Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396D using 3 AA alkaline batteries. **Unique Data Skip** - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. **Memory Backup** - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. **Manual Channel Access** - Go directly to any channel. **LCD Back Light** - A blue LCD light remains on when the back light key is pressed. **Autolight** - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. **Battery Save** - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. **Attenuator** - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.



Bearcat® BC246T Trunk Tracker III

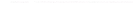
Suggested list price \$399.95/CEI price \$214.95

Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

25,000-54,000 MHz., 108,000-174,000 MHz., 216,000-224,9800 MHz., 400,000-512,000 MHz., 806,000-823,9875 MHz., 849,0125-868,9875 MHz., 894,0125-956,000 MHz., 1240,000 MHz - 1300,000 MHz.

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group



ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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E22 Revealed as All India Radio

In the October 2005 *Utility World*, there was a long discussion of a new “numbers” station which had re-appeared after several years. It used 15040 and 17386 kilohertz (kHz), and then 11620. The powerful amplitude modulation (AM) broadcast attracted quite a bit of attention due to its reappearance coming right before a terrorist bomb attack in London.

New information has been revealed by subsequent investigation by “Mike L” of ENIGMA 2000, the electronic incarnation of the European Numbers Intelligence Gathering and Monitoring Association. Mike keeps the “Control List” of shorthand station designators, which first gave “E22” its name as the 22nd English-speaking station thus identified. While the announcers didn’t speak English, the phonetics used in the mysterious, 3-figure, repeated messages were in this language.

Information was accumulated by Mike’s ad-hoc multi-national monitoring effort, followed by painstaking analysis of voices heard both in off-mike chatter and from an entertainment radio playing in the room. Ultimately, the listeners were able to rather convincingly determine that this was not a “spy numbers” station at all. In fact, it was only a series of engineering test transmissions on various All India Radio transmitters.

The major breakthrough came when native speakers were able to identify the several off-mike South Asian dialects being heard. Also, the background radio program was identified as an interview in the Thai language.

While few shortwave broadcasting networks would test in such a creepy manner, people familiar with All India Radio found it

plausible. This far-flung network operates many transmitters in some pretty isolated places. Also, past security problems give a motivation for some secrecy in the technical details.

Such testing of broadcast transmitters would certainly explain such characteristics as the use of truly world-spanning power, the lack of attention to mike technique and studio practice, and the generally casual attitude shown by the personnel. (Even though some real “spy” networks have all of these attributes – see next item.)

And so, any connections between ex-E22 and terrorism are undoubtedly mere timing coincidences, as borne out by the many subsequent transmissions which were not followed by any trouble at all. Mike notes, with some regret, that he will now have to mark E22 as “Withdrawn” on the next Control List, as not fitting the definition of a “numbers” station. Several Morse code stations are being similarly withdrawn, including the infamous M22, a spooky-sounding Israeli broadcast which turned out to be merely Navy traffic and weather brevity codes.

❖ Cuba Again (and Again...)

Further analysis has been done by your editor on the message callups from the “other” Cuban spy station, the one which sends letter-substituted “cut” numbers in continuous-wave (CW) Morse telegraphy. The CW broadcast has been showing some of the same incrementing message numbers heard on the AM voice station. This is actually not much of a revelation, given that both use essentially the same format. They have even been known to accidentally come up in the “wrong” mode, or both at once.

The groups in the callup might be indicating how many times a particular message has been broadcast. There might also be some information used to determine if the message has been already copied. Finally, many messages are undoubtedly dummies, given the huge increase in this traffic from Cuba and possibly other locations still under investigation. But, as yet another recent spy bust has shown, many are not.

This operation’s noted sloppiness shows no sign of abating. Broadcasts continue to start late and in the middle, or have bad audio. Recently, yet another voice transmission came up with Radio Havana Cuba instead of the night’s traffic. Pity the poor spooks who actually need to decode these messages!

❖ HF DL Frequency Updating

HF DL stands for High-Frequency Data Link. It’s a global digital communications system deployed by Aeronautical Radio, Incorporated (ARINC) for use by airliners in flight. It integrates seamlessly with other ARINC radio systems, such as ACARS (Aircraft Communications Addressing and Reporting System).

HF DL is not a simple system. It has 14 operating ground stations and two or three decommissioned older ones. Around 150 frequencies are allocated to the entire network, and each ground station is given its own portion of these from which it automatically chooses one to three active ones, depending on band conditions and overall system load. Some are allotted to more than one station, but only one station will be using the frequency at any given time.

All the ground stations broadcast binary information in their test “squitters” every 32 seconds. The receiver, over the course of several squitters, ultimately extracts all the active frequencies in the world at that particular time of day. These tend to repeat daily.

Now comes the hard part: The entire frequency table changes from time to time. Usually, just when the HF DL fan finds a few really good ones, they all change again. Fortunately, the system transmits a version number that serves to inform receiving stations whether they need an update. It’s in those multiple lines of “computerese” spat out by hobby-level HF DL decoding programs. At press time, we’re on number 27, but this might well have changed by publication time.

Aircraft can spot the mismatch and download the new frequencies. One popular hobby program, PC-HF DL, can do something roughly similar. It stops showing frequencies in kHz, reverting to sequence numbers until it can intercept the table being sent to an aircraft and update itself.

Barring that, the user can always get the new file from somewhere and put it in PC-HF DL’s home directory. Usually HF DL fans start putting the new list on web sites in pretty good order. This list can also be used with other programs to look up the frequencies for yourself.

The final question, of course, is why would anyone want to do this? Well, for no big reason, other than that HF DL is fun. Listening doesn’t compromise air security, because resulting information is already available to the public elsewhere, with a lot less work.

Happy flying until next month.



Typical ACARS cockpit display

ABBREVIATIONS USED IN THIS COLUMN

5N1 / 5N2	5 data bits, No parity bit, 1 or 2 stop bits
AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
AWACS	Airborne Warning and Control System
CAMSLANT	Communication Area Master Station, Atlantic
COTHEN	Customs Over-The-Horizon Enforcement Network
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
DSC	Digital Selective Calling
E10	Israeli English "female" phonetic "numbers"
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communications System
ITA2	International Telegraph Alphabet #2 "Baudot"
JSTARS	Joint Surveillance Target Attack Radar System
M8a	Cuban CW "numbers" cut to ANDUWRIGHT
MARS	US Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
PACKTOR	Packet Teleprinting Over Radio
PR	Puerto Rico
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
STANAG	Standardization Agreement
UK	United Kingdom
Unid	Unidentified
US	United States
USCG	US Coast Guard
V2	Cuban Spanish "female," 3-message variant
VOLMET	Aviation Weather (loosely from French)

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

2187.5 419497000-Maritime Mobile Service Identity of unknown vessel making a DSC safety test with Lyngby Radio, Denmark, at 2143. (Day Watson-UK) *[The prefix is India, for whatever that's worth. -Hugh]*

2199.0 XSS-Unknown government or military "XSS Net," sounding in ALE, also sounding on 2217.3, 3161.0, 3227.4, 4166.3, 4226.5, and 10360.0, at 2129. (Watson-UK)

2617.5 GYA-UK Royal Navy Fleet Weather and Oceanographic Centre, Northwood, with a FAX surface analysis chart at 2100. (Watson-UK)

3003.0 Unid-Possible pirate beacon, with buzzy databursts in pairs, at 0130. (Tom Severt-KS)

3161.0 XGH-Unknown, working XSS in ALE, at 0804. (Watson-UK)

3349.0 NNN0JYV-US Navy/Marine Corps MARS, opening the net at 0100. (Mark Cleary-SC)

4028.0 Cuban AM "numbers" (V2a), 5-figure groups in progress at 0115 and 0644. (Severt-KS)

4211.0 Unid-Petrobras, Brazil, ARQ operator chatter in Portuguese, at 0340. (Bob Hall-RSA)

4213.0 WLO-Mobile Radio, AL, SITOR-B maritime information at 0159. (Severt-KS)

4219.0 TAH-Istanbul Radio, Turkey, working a vessel in SITOR-A, then back to marker, at 2024. (Watson-UK)

4228.0 UIW-Kaliningrad Radio, Russia, with navigation warnings in 3rd-shift Cyrillic RTTY, at 1500. (Watson-UK)

4235.0 NMF-USCG, Boston, MA, with Atlantic surface chart FAX, at 0350. (Jeff Seale-KY)

4316.0 NMG-USCG, New Orleans, LA, FAX surface forecast chart at 0105. (Seale-KY)

4244.0 DAO4A-Kiel Radio, Germany, CW identifier every 3 minutes in PACTOR-III markers, at 2028. (Watson-UK)

4271.0 CFH-Canadian Forces, Halifax, FAX ice chart at 2230. (Watson-UK)

4372.0 "K-8-I"-US Navy, working "4-C-D" and "V-2-W" in a Link-11 coordination net, at 0118. (Cleary-SC)

4396.0 WLO-Mobile Radio, AL, voice synthesized Caribbean weather at 0020. (Seale-KY)

4583.0 DDK-Pinnenberg Meteo, Germany, RTTY weather codes at 0105. (Hall-RSA)

4724.0 Publicize-US military, with a 28-character EAM simulcast on 8992, 11175, and 15016, at 1543. Reprimand, 28-character EAM simulcast on same frequencies, at 1759. (Jeff Haverlah-TX) Andrews-US Air Force HF-GCS, calling Omni 02 at 1652. (Cleary-SC)

4739.0 Red Talon 71A-US Navy P-3C, calling Goldenhawk (USN, Brunswick, ME), at 1543. (Cleary-SC)

5320.0 Cutter Cochito-USCG, position for Sector Field Office Eastern Shore, at 0029. (Cleary-SC)

5690.0 East City Air-USCG, weather for unknown aircraft on a search, at 1320 (Mark Morgan-OH) Cape Air-USCG, patch via CAMSLANT to Coast Guard 2140, at 1434. (Cleary-SC)

5696.0 CAMSLANT-USCG, working Coast Guard 2127 at 1241. (Cleary-SC)

5708.0 Magic 51-UK Royal Air Force E-3, ALE-initiated patch to Shaw AFB, SC, at 1352. (Cleary-SC)

5711.0 Liberty Star-NASA Booster Recovery Vessel, working Cape Radio and Surveillance Control Officer before a Cape Canaveral launch, at 1532. (Cleary-SC) Stargate-US Air Force E-8C JSTARS, working unheard station at 1919. (Allan Stern-FL)

5732.0 Panther-DEA, Bahamas, working Rescue 13 regarding a sinking vessel, COTHEN net, at 2050. (Cleary-SC)

6243.0 XSS-Unknown "XSS Net," working XGH in ALE, at 1202. (Watson-UK)

6418.0 VTP5-Indian Navy, Vizakhapatnam, CW weather forecast at 1652. (Watson-UK)

6428.0 ABC-Israeli intelligence phonetic callup (E10), null-message format at 1952. (Ary Boender-Netherlands)

6640.0 Continental 712-Airliner with patch to Medlink regarding a sick passenger, at 2243. (Severt-KS)

6694.0 Rescue 306-Probable Canadian Forces, checking with Halifax Military for traffic from the Rescue Coordination Centre, at 1318. (Cleary-SC)

6715.0 Halifax Military-Canadian Forces, NS, voice check and RTTY with Trenton Military, at 0142. (Cleary-SC)

6721.0 Sentry 40 US Air Force E-3 AWACS, ALE-initiated patch to Raymond 24 (Tinker AFB, OK), at 1958. (Cleary-SC)

6761.0 Reach 278-US Air Force Air Mobility Command transport, coordinating refueling with tanker Ethyl 95, at 0254. (Cleary-SC)

6768.0 Cuban AM "numbers" (V2a), distorted audio, in progress at 2335. (Seale-KY)

6797.0 Cuban CW "numbers" (M8a), in progress at 1231. (Camilo Castillo-Panama)

6855.0 Cuban AM "numbers" (V2a), usual daily schedule 6 times, also started once with Radio Havana instead, at 2100. (Castillo-Panama) V2a, in progress at 2008 and 2110. (Severt-KS)

6866.0 Cuban CW "numbers" (M8a), in progress at 1306. (Castillo-Panama)

6874.0 TYVC1-Spanish Guardia Civil, calling TYVV1 at 1927. (Watson-UK)

6933.0 Cuban CW "numbers" (M8a), at 1201, and in progress at 1233. (Castillo-Panama)

6985.0 USAIS1012-US Army, VA, ALE to USADA1010, then voice as "P-9-I" with "Q-8-Q," at 2317. (Cleary-SC)

7516.0 TZSE-Spanish Guardia Civil, Melilla, calling TXXX, ALE at 0732. CRC2M-Venezuelan Military, calling CLC24M, ALE at 2350. (Watson-UK)

7519.0 Cuban CW "numbers" (M8a), also up with different message on 7482, at 2203. (Severt-KS)

7527.0 LNT-USCG CAMSLANT Chesapeake, working 502 on COTHEN, at 0306. TWVS2-Spanish Guardia Civil, Salamanca, calling TWVB2 at 0800 and TWVP2 at 0807. (Watson-UK) 3A,

- 7527.0 position for Panther (DEA, Bahamas) at 2247. (Sevart-KS)
93A-DEA aircraft, setting guard with Panther at 1606. (Cleary-SC)
- 7597.0 CLC24-Venezuelan military, San Cristoba, working SCLC24, at 2333. (Watson-UK)
- 7646.0 DDH7-Hamburg Meteo, Germany, RTTY weather and marker at 1047. (Watson-UK)
- 7887.0 Cuban AM "numbers" (V2a), 7 times at 2000, once at 2100. (Castillo-Panama) V2a, started late and missed callup, two different times at 2004. (Sevart-KS)
- 7974.0 Cuban CW "numbers" (M8a), in progress at 2134. (Sevart-KS)
- 7975.0 Cuban AM "numbers" (V2a), twice at 1600. Cuban CW "numbers" (M8a), 4 times at 2102. (Castillo-Panama)
- 8010.0 Cuban AM "numbers" (V2a), twice at 1700, twice starting late at 1806. (Castillo-Panama) BU1-Romanian Ministry of Information, Bucharest, calling CRA, ALE at 0836. UM12-Algerian military, calling JL10, ALE at 2348. (Watson-UK)
- 8097.0 Cuban AM "numbers" (V2a), 4 times at 1800, 7 times at 1900. (Castillo-Panama) Hummy carrier, then V2a starting in middle, at 1808. (Sevart-KS)
- 8136.0 Cuban CW "numbers" (M8a), in progress at 0612. (Sevart-KS) M8a, 3 times at 2303. (Castillo-Panama)
- 8186.0 Cuban CW "numbers" (M8a), in progress at 0707. (Sevart-KS)
- 8195.0 Echo Whiskey-US Navy battle group net, also Echo Foxtrot, at 1315. (Ron Perron-MD)
- 8337.6 Stingray 13-USCG, working Shark 29 at 2316. (Cleary-SC)
- 8414.5 HOHD-Vessel Asterix I, DSC safety test to Istanbul Radio, at 1530. (Watson-UK)
- 8419.0 WLO-Mobile Radio, AL, CW identifier in SITOR-A markers, at 1428. (Seale-KY)
- 8428.0 NMN-US Coast Guard CAMSLANT, VA, CW in SITOR-A marker at 1335. (Seale-KY)
- 8446.5 HEB28-Bern Radio, Switzerland, CW identifier every 3 minutes, also working a vessel on 8333 in PACTOR-III, at 1650. (Watson-UK)
- 8454.0 UIW-Kaliningrad Radio, Russia, RTTY traffic and markers, listening on 12464.5, at 1640. (Watson-UK)
- 8461.7 9MR-Malaysian Navy, coded RTTY traffic at 0115. (Hall-RSA)
- 8478.5 FUF-French Navy, Ft De France, working vessel "FG" in STAN-AG 4285 (300, long, 5N2, ITA2), at 2023. (Watson-UK)
- 8480.0 HZY-Ras Tannurah Radio, Saudi Arabia, CW weather, navigation warnings, and traffic list, at 1640. (Watson-UK)
- 8503.9 NMG-USCG, New Orleans, FAX chart at 1905. (Sevart-KS)
- 8551.5 CTP-Portuguese Navy, Lisbon, RTTY marker advising all warships that the station was down with technical problems, at 1702. (Watson-UK)
- 8568.0 FUV-French Navy, Djibouti, test loop in STANAG 4285 (300, long, 5N2), at 2032. (Watson-UK)
- 8971.0 Red Talon 71A-US Navy P-3C, working Goldenhawk at 1547. (Cleary-SC)
- 8983.0 CAMSLANT-USCG, VA, maintenance issues with Coast Guard 1717, at 2021. (Sevart-KS)
- 8992.0 Cobra 27-US Air Force RC-135, patch via Andrews to Raymond 21 (Offutt AFB, NE), at 1814. (Cleary-SC) Consider-US military, voice and data with Andrews, then went to 11153, at 2246. (Haverlah-TX)
- 9007.0 Canforce 85-Canadian Forces, getting weather from Trenton Military at 1319. (Cleary-SC)
- 9017.0 Consider-US military, voice and data with Andrews at 2324. (Haverlah-TX)
- 9025.0 E30352DAT-US Air Force E-3 AWACS, ALE-initiated patch to Tinker Meteo, OK, then voice as Sentry 40, at 2015. (Cleary-SC)
- 9152.0 Cuban CW "numbers" (M8a) at 1201. (Castillo-Panama)
- 9323.0 Ski Slope-US military, clear and secure with Andrews at 0120. (Haverlah-TX)
- 10144.0 DKOWCY-Amateur propagation beacon, Germany, identifying in CW at 1203. (Watson-UK)
- 10024.0 Unknown-Lan Chile flight on South American air route net, at 0310. (Castillo-Panama)
- 10051.0 Gander-Gander VOLMET, Canada, aviation weather at 1323. (Seale-KY)
- 10253.5 Unid-Scrambled voice, then clear in Spanish, at 3314. (Sevart-KS)
- 10325.0 Cuban CW "numbers" (M8a) at 0402. (Castillo-Panama)
- 10331.0 KZN508-Sail Mail, CW identifier in digital marker, at 2033. (Sevart-KS)
- 10536.0 CFH-Canadian Forces, Halifax, NS, FAX chart at 2019. (Sevart-KS)
- 10945.0 CFH-Canadian Forces, Halifax, RTTY marker at 2117. (Sevart-KS)
- 11175.0 Andrews-US Air Force, MD, sending Bad Daddy to 11220 for data (after no joy on Mystic Star Foxtrot-311), at 1616. (Haverlah-TX) Tuff 14-US Air Force B-52H, patch via Puerto Rico HF-GCS to Barksdale AFB, LA, at 1902. Reach 6008-US Air Force, patch via Puerto Rico to Mildenhall, UK, for weather, went to 11159 and 13200, starting at 1911. (Cleary-SC) Air Force Rescue 987-US Air Force, patch via Puerto Rico to USCG District 7, at 2145. Otis 12-US Marine Corps tanker, patch via Puerto Rico to Otis Base, at 2155. (Andy Prothmann-Canada) Snoop 34-US Air Force RC-135, patch to Snoop Ops (Offutt AFB, NE), at 2155. (Sevart-KS)
- 11217.0 Wizard-US Air Force E-8C JSTARS, working Stargate at 1916. (Stern-FL)
- 11220.0 Andrews-US Air Force, voice and data with Bad Daddy (came from 11175), at 1616. Portable-US military, attempting data with Andrews at 2321. (Haverlah-TX)
- 11494.0 Hammer-US Customs, March Air Reserve Base, CA, clear and secure on COTHEN with Omaha 57B (a Cessna 550), at 1526. (Cleary-SC)
- 12087.0 HQ7-Possible US National Guard, working P030AN, ALE at 2059. (Sevart-KS)
- 12251.0 AAA-Israeli Defense Force, Tel Aviv, calling M72, ALE at 1140. (Watson-UK)
- 12390.0 GYA-UK Royal Navy, Northwood, Persian Gulf weather FAX at 1550. (Watson-UK)
- 12458.5 UIDB-Russian vessel *Atlantis*, working a Russian coastal station in very fast CW, at 1700. (Watson-UK)
- 12557.7 SSEM-Egyptian vessel *Al Minufiyah*, DSC safety test with Lyn-gby, at 1127. (Watson-UK)
- 12574.0 Unid-Possibly Russian vessel *Aleksander Kosarew*, working possibly Murmansk, Russia, in 3rd-shift Cyrillic RTTY at 1110. (Watson-UK)
- 12577.0 VQEV7-UK vessel *Sandra Blanca*, DSC safety test with Olympia Radio, Greece, at 1128. (Watson-UK)
- 12579.0 NMF-USCG, Boston, MA, SITOR-B maritime information at 1636. (Sevart-KS)
- 13200.0 Andrews-US Air Force HF-GCS, EAM echoed by Puerto Rico, at 1720. (Sevart-KS)
- 13211.0 Ski Slope-US military, data with Andrews, then secure voice on this and 9923, at 0056. (Haverlah-TX)
- 13510.0 CFH-Canadian Forces, NS, RTTY weather at 1355, then into FAX at 1400. Unid-"Whales" sound [Circuit noise? -Hugh], brief interruption by someone tapping on mike, at 1946. (Sevart-KS)
- 13886.3 Unid-Moscow Meteo, clear FAX chart at 0630. (Hall-RSA)
- 13927.1 King 70-US Air Force Rescue HC-130, patch to King Ops via AFA1WP, US Air Force MARS, OH, at 2035. (Cleary-SC)
- 15016.0 Landfall-US military, 28-character EAM simulcast on 4724, 8992, and 11175, followed by Andrews with same EAM, at 1757. (Haverlah-TX)
- 15920.0 CFH-Canadian Forces, Halifax, RTTY marker at 2241. (Sevart-KS)
- 16223.7 Unid-Egyptian MFA, Cairo, Arabic traffic at 1559. (Hall-RSA)
- 16260.0 P6Z-French MFA, Paris, calling N2G in FEC, at 0655. (Hall-RSA)
- 16809.0 WLO-Mobile Radio, AL, automated SITOR-A system taking a free AMVER (Automated Mutual Assistance Vessel Rescue System) position message; advised the unknown vessel that an AMVER got the sender free news access, so the ship proceeded to request Voice Of America and British Broadcasting Corporation news headlines, all starting at 1930. (Hugh Stegman-CA)
- 16906.5 FUV-French Forces, Djibouti, RTTY test loop at 1541. (Hall-RSA)
- 16951.5 6WW-French Forces, Dakar, Senegal, RTTY test loop at 1530. (Hall-RSA)
- 17934.0 02-HFDL ground station, Molokai, HI, sending airport weather for RJAA (Tokyo) to N69063 (Continental 0017, a 767), at 0001. (Stegman-CA)
- 18238.0 ZSJ-South African Navy, Silvermine, FAX surface chart at 0740. (Hall-RSA)
- 18594.0 13C-possible DEA, position for unheard station on COTHEN, at 2240. (Sevart-KS)

Armada de Argentina plus a Mystery

Over the coming months we're going to profile a number of digital utility users in detail. The hope is that, armed with the frequencies and habits of these stations, many of which have remained constant through time and technological change, you'll be better informed and better able to identify these stations and any new developments that take place.

We also profile a particularly interesting mystery station that is one of those signals that once you hear it once, you seem to find it everywhere quite by accident.

❖ Argentina's Navy

For no particular reason, other than because of a recent catch, we're going to open with a look at the Argentine Navy.

As if to illustrate the unchanging habits of many HF digital users, I recently confirmed the Argentine Navy as the origin of an encrypted signal that I had first logged in 1996.

Given the many miles of Argentine coastline, extending to the outer reaches of Antarctica, you would expect a reasonably sized fleet. Like many South American countries, some vessels have been acquired from the Royal Navy and other fleets that have downsized or modernized over the last decade.

Argentina currently operates a mixed fleet of around 30 destroyers, frigates, corvettes, submarines, and mine hunters, in addition to icebreakers and supply ships, from its main ports in Puerto Belgrano, Baterias, Rio Grande, Rio Gallegos, Ushuaia and Mar del Plata. An Air Command supports the fleet from Puerto Belgrano.

Communications have been noted using the following modes:

- 75bd/170Hz Baudot RTTY (most common), also 100bd/170Hz
- 100bd/170Hz SITOR-A and SITOR-B
- 300bd and 1200bd AX.25 Packet Radio
- 120lpm HF Facsimile
- USB Voice (sometimes using HC256 crypto)

Traffic in RTTY and SITOR-A is often off-line encrypted with five-letter groups. While not unique to the Argentines, much of this off-line content is delimited by the groups ZSYNZ and ZENDZ and sometimes BSYNZ and BENDZ. It is also interesting to note that no MIL-188-141A ALE activity has been associated with the fleet, although most other South American navies have been active in that mode for some time.

Callsigns used are:

LOL Buenos Aires
LOF Mar Del Plata
LOK Unidentified
LOR Puerto Belgrano
LOV Ushuaia

There are also communications from a lot of minor regions, small ports, lighthouses, etc. in the Atlantic Ocean and in Paraná River and Uruguay River.

Here are the frequencies used (center of data for digital, USB for voice, with // denoting operation on two or more parallel frequencies simultaneously):

2041.2	RTTY 75/170
2384.5	USB Voice
3120.0	RTTY 100/170
3175.1	RTTY 75/170 //6491.5 //8303.0 //12669.0kHz
3242.0	USB Voice
3260.2	RTTY 75/170
3345.2	SITOR-B // 8319.7kHz
3345.4	FAX 120 //4441.9kHz
4225.5	RTTY 75/170
4351.7	Packet
4441.9	FAX 120 //3345.4kHz
4521.7	SITOR-B
5075.0	USB Voice
5188.5	USB Voice
5705.0	RTTY 75/170
6230.0	RTTY 75/170
6491.5	RTTY 75/170 //8303kHz
6771.5	USB Voice
6790.0	USB Voice
7398.5	USB Voice
7399.9	FAX 120 //4441.9kHz
7771.7	SITOR-B
8031.5	USB Voice
8108.5	USB Voice RTTY 75/850
8194.0	RTTY 75/170
8302.9	RTTY 75/170
8303.0	RTTY 75/170
8318.0	USB Voice
8319.9	FAX 120
8507.5	USB Voice
8705.0	USB Voice
8980.0	USB Voice
9023.0	USB Voice & Packet
9985.4	RTTY 75/170
11179.0	RTTY 75/170
11206.0	RTTY 75/170
12465.9	RTTY 75/170 //12669 //8303kHz
12669.0	RTTY 75/170 // 8303kHz
12799.5	USB Voice
14355.5	RTTY 75bd/170 & USB Voice
14368.7	Packet
14402.5	USB Voice
14465.0	USB Voice
14651.5	USB Voice & Packet
15820.0	USB Voice QSX 14694
17215.7	RTTY 75/170 //8303.0kHz
17228.7	RTTY 75/850
18051.5	USB Voice



18240.0	USB Voice
18278.5	USB Voice & Packet
18352.0	RTTY 100bd
20518.5	USB Voice
20520.7	Packet

❖ Mystery SITOR-B Station

Here's one of those stations that you hear once and then seemingly bump into elsewhere with spooky coincidence. I first came across the station in late 2005 and have since come across it several times at all times of day. The station is strongest in the US (East Coast) during late evenings, probably suggesting a European origin, and it uses regular channels.

The operation is very distinctive. Frequency offset is a very odd .36 kHz, using full on-line encryption SITOR-B in selective broadcast (SBRs) mode, no call-up, no headers, no trailers. The station simply comes on frequency on the five minutes past the hour and half hour, sends 18 minutes of traffic, and then simply goes off-air.

Here are some frequencies and times to watch for:

4026.36	at 0200
4617.36	at 0100
5807.36	at 0030
6946.36	at ???
7746.36	at ???
8163.36	at 2030
9081.36	at ???
9166.36	at 2100
9986.36	at 0130
13406.36	at 1300

Other monitors report an additional 15 or so frequencies that have been used. I would appreciate any further reports of the station.

My thanks go to Mr X for providing the additional detail around the Argentineans. That's it for another month. Enjoy your digital listening.

Resources

Haze Gray Navieswww.hazegray.org/worldnav/americas/argent.htm
Armada Argentina.....www.ara.mil.ar

Major Cuts at VOA; English on the Way Out

The Winter 2006 issue of *News & Views*, from AFGE Local 1812 at VOA, warned that a report was coming from the consulting firm Booz Allen Hamilton, following a review of IBB organizational structure last summer.

While we're not certain of any direct effect, bombshells started falling at the end of January, with word that there would be a 90,000-hour cut in shortwave transmission by VOA and other IBB outlets. On Feb. 1, a new schedule went into effect. Most existing transmissions remained, but on fewer frequencies than before. The 90,000 refers to frequency-hours per year, which works out to 245 per day. See CUBA [non] for one example of the result, and GERMANY. Chris Greenway suggested that this leaner operation would not be such a loss if more effort were put into finding fewer good frequencies and keeping them.

The day after the frequency changes, Kim Andrew Elliott told *DX LISTENING DIGEST*, "I helped VOA *News Now* write new frequency announcements. In gratitude, it was proposed that I voice those frequency announcements. That request was denied. I am still banned from being heard on VOA."

Wolfgang Büschel computed the initial reductions per day: VOA, 103 hours and 45 minutes, RFE 86 hours, RFA 17 hours, OCB [Marti] 32 hours. Most of the broadcasts from the Tinian relay at 500 kW were cut to 250 kW.

A week later, more bad news: the impending end of VOA broadcasts in English, although it remained unclear exactly what VOA English broadcasting would consist of on the road to the end. Why is VOA broadcasting in English being destroyed using the "War on Terror" as the excuse?

"The budget projects elimination of *News Now* English radio broadcasting in FY '07, but Special English and English to Africa will not be affected by the cuts, and VOA's popular Internet site will become the major English outlet for our worldwide news-gathering operation."

However, a source at VOA said there will be no more newscasts, not even on the VOA Web site, and the English-language music channels will end. Listeners are encouraged to write their representatives in the U.S. House and Senate and oppose the proposed cuts.

Sanford Unger, former VOA director, interviewed on NPR: "It is as if to say that we as a country and as a political culture prefer that people around the world not get their news from the United States in English; we prefer that they get it from al Jazeera, China, Russia, France, Australia, all sorts of people who are broadcasting in English."

Martin Schram, Scripps Howard columnist, summed it up: "VOA is DOA in Bush Budget." Schramm has been a participant in VOA's long-running series *Issues in the News*.

Kim Elliott, audience research analyst at the International Broadcasting Bureau, notes that these budget proposals require Congressional approval, and modifications are very possible before they are scheduled to take effect October 1.

Many other language services are affected, including the elimination of VOA radio services in Albanian, Bosnian, Croatian, Georgian, Greek, Hindi, Macedonian, Russian, Thai, and Turkish. Some of the reductions could already go into effect with the A-06 season from March 26.

Libyan Clandestine Resumes SW, Provoking Jamming War - Amal and the Afternoon Visitors

"Forced off satellite by a sophisticated and aggressive jamming

campaign orchestrated by the government of Libya, Sowt Alamel, Libya's Voice of Hope, returned to the airwaves today after weeks of silence." So reported Nick Grace, *Clandestine Radio Watch* on Jan. 25.

It turned out that the broadcast was at 12-14 UT, initially on 17660. Unfortunately, that quickly drew Libyan-sponsored jamming from several different sources, and collided with an existing service for Somalia [q.v.], so Saut al-Amal (alternate spelling) began wandering everywhere from 17655 to 17685 during the next three weeks, as monitored daily by our *DX Listening Digest* team, notably José Miguel Romero in Spain, Tarek Zeidan in Egypt, Wolfgang Büschel and Kai Ludwig in Germany, Mauno Ritola in Finland, Björn Fransson in Sweden, Noel Green and Mike Barraclough in England, Raúl Saavedra in Costa Rica, Bernie O'Shea in Ontario, Steve Lare in MI, Terry Krueger in FL.

It would be a different frequency just about every day, and even changing within the broadcast, but at least some of the Libyan jammers would pounce on it. There was one Libyan service overtly registered already in the area on 17670 via France, so that carried openly Libyan programming in Arabic. Then there was a station playing continuous Arab music, later mostly drumming at the rate of two beats per minute. (How do you say "Firedrake" in Arabic?) From before 1500 there would still be pulse/bubble jamming on 17670, but that had nothing to do with this: it was Cuba jamming all day a vacated Radio Martí frequency.

Then there was another transmitter playing nothing but African music, much of it 'high-life', which we enjoyed listening to. It soon became apparent that this was an Africa Number One transmitter in Gabon, which coincidentally had disappeared from its usual schedule on nearby 17630; that was quickly occupied by Germany and China. Trouble is, SAA always closed at 1401 UT, but the music would go on and on for another sesquihour or more, needlessly interfering with other stations, sometimes only 5 Hz away from Voz Cristiana, Chile, on 17680. Since there were never any IDs or announcements, Gabon and France maintained a degree of deniability of culpability. Some of the jamming would get underway as early as 1130.

There also appeared to be some lower-powered transmitters within Libya involved, but since localized jamming on such a high frequency is not very effective, sites outside the country were needed to do this, and Libya somehow was able to get Gabon and/or France, and probably transmitters in other countries, to do its dirty work from a favorable skip distance.

The site used by SAA was not disclosed, but propagational factors led us to put it in Russia, Former Soviet Union, or eastern Europe. ILG guessed it was Moldova. Some of the jamming probably came from that area, too.

Wolfgang Büschel points out that according to *Transmitter Documentation Project*, Libya once had 9 x 500 kW and 10 x 100 kW SW transmitters, but few if any of these have been on the air in recent years.

As time went on, the jamming became more effective. Libya obviously had real-time monitoring to keep track of the latest SAA frequency shifts and match them. Most were in 5-kHz steps, but some of the jamming was at odd offsets. Another innocent victim of this radio war was AWR in Vietnamese via Madagascar on 17670 at 13-14.

Online Loggings Databases

Quickly find what has been reported on any SWBC frequency in the last several years: <http://www.naswa.net/logs/>
<http://www.dswci-sw-logs.dxr.info/download/logs.pdf>

AFGHANISTAN As of mid-Feb, still no sign of the new 100 kW SW transmitter supplied by India. So this is all we have (gh) R. Peace, 9345, tentative, no ID, but stronger than before, at 1230-1400 with news at 1230-1245. Has also used 9325 and 9365, irregularly and only two of them simultaneously. Not the same as R. Solh on 15265 via UK (Mauno Ritola, Finland, DXLD)

ALGERIA [non] On 17840, unID in French at 12-14 Jan 22 (Ralf Ladusch, A-DX via Eike Bierwirth, DXLD) It's Algeria's network 3 // longwave 252 but 6 seconds behind it (Herbert Meixner, Austria, *ibid.*) Likely relay from France, which also uses 17840 for Libyan relay at 16-17 (gh) Algeria had abandoned SW in 2003 (Kai Ludwig, Germany, *ibid.*) Not only on 17840 at 1220 but // 15255 with phone-in, ads (Jari Savolainen, Finland, *ibid.*) Was testing via TDF, Issoudun, France, 500 kW, heard Jan 20-24, also at 0600-0758 on 9885, but missing from Jan 25.

A tentative A-06 schedule was registered for these and other transmissions, all to different parts of Africa, actually closing 2 minutes earlier: 06-07 11725 11860; 07-08 13620 13675; 08-09 13620; 12-14 15255 15465; 18-19 13775 13800; 19-20 11860 13800; 20-22 9885. Not specified which in French, which in Arabic.

The week after the TDF relays, more tests were made via VT Merlin sites in the UK, on 9735, 12020, 13750 17690, 17755, 5985, 7105 (Observer, Bulgaria) and were heard by monitors in Europe and North America, but lasted only until Feb 5 (Bernie O'Shea, ON, DXLD) Quite a few interference problems. Algeria then evaluated which one to go with (gh) Scheduled to resume on Feb 15, again via France on 9885, 11830, 13620, 15255, 17840, 9475, 7325 (Observer, Bulgaria) But still not heard on Feb 16 (gh)

ARMENIA V. of Armenia changed schedule in Feb, including English to 2010-2030 on 9965 (Edwin Southwell, UK, *World DX Club* via Mike Barraclough) Also on 4810 (Mike Ford, *ibid.*) Barring further changes should shift to 1910 for A-06, though last summer's frequency was 9775 (gh)

AUSTRALIA Keith Glover passed away Feb 3. He was a consummate communicator and as presenter of Radio Australia's *Listeners' Mailbag* became an 'interactive' broadcaster well before the term was popularized. Keith retired from the ABC in 1985 (Harold, *aus.radio.broadcast* via Mike Terry) His warm voice made many friends for Australia; we remember him fondly from our earliest SWling days in the late 50s/early 60s (gh) He did his show with passion. They even sent out airmail letters to tell you in advance when you were going to be called on the airwaves of Radio Australia. Those were indeed the days when distance had magic (Jonathan Marks, *Media Network blog*)

BOLIVIA R. Logos, new station in Santa Cruz on 6165: On Dec. 18, 2005, Ray Rising (CP6RR), Julio Andino and I put Radio Logos on 6165, with a near vertical incidence antenna using four half wave dipoles fed with a 5 kW AM transmitter, on the same plot of land as RCN [Radio Centenario La Nueva] which has been broadcasting on 4865 for a number of years. Initial programming was mostly a satellite feed from ALAS in Spanish between 1000 and 0100. Eventual plan is to produce more local programming including indigenous languages (Wayne Borthwick, VA7GF, DXLD) Bonaire would block it after 2300 and 1100, but should be clear at 1000 and maybe before 2300, Croatia and Chad permitting. Perhaps due to the antenna designed to minimize long-range coverage, not a single DX report of this appeared in the following weeks; it could not even be heard nearby in Argentina, says Arnaldo Slaen who tried for it repeatedly. Wayne heard it from the local area before he left, and reconfirmed with his contacts there that it is indeed on the air (gh) Be patient; perhaps like other Latin American stations starting out with NVI, they will eventually change to an antenna more favorable for DX (Henrik Klemetz, *condig list*)

A new Bolivian heard from my vacation spot at Villa Giardino, Argentina is R. Cooperativa, Huanuni, Oruro on 5983.7 in the 1045-1145 period, in Spanish and Aymara (Arnaldo Slaen, *condig list*) Announces it is from the Centro Minero Huanuni (Rogildo F. Aragão, Bolivia, *radioescutas*)

R. Virgen de Remedios, Tupiza, with mass at 2258-2340 on 5744.1 (Rafael Rodriguez R., Colombia, *condig list*) Has a second // frequency which wanders every day: 4732.7 at 1044, 4734.1 at 0250, 4730.6 at 1050 a week later; 4732.3 at 1045, 4733.4 at 0240, always with Catholic programming (Arnaldo Slaen, Argentina, *ibid.*)

R. Yura asks for correspondence to radioyura@hotmail.com (Nicolás Eramo, Argentina, DXLD) R. Yura, La Voz de los Ayllus, 4716.7, full-data letter with beautiful station pennant and sticker in 3 months for a Spanish report. V/s Omar Flores (Sam Barto, CT, *QSL Report*, *NASWA Journal*)

R. Pio XII was put off the air in mid-Feb by the theft of a link receiver at its San Felipe mountaintop site (El Deber, via Gabriel Iván Barrera, *condig list*) Not clear if this affected SW 5952 as well as FM and AM (gh)

BRAZIL Rádio Capixaba, Vitória was reactivated in Feb on 4935, ID at 2201; the only SW station in Espírito Santo state (Célio Romais, Brasil, *radioescutas*)

Pirate from unknown location with *Sertanejo Apaixonado* program for long-distance truckers on 7842v with poor signal and elocution, heard after midnight (0300 UT), ID as Rádio Diário da Manhã (Rudolf Grimm, SP, DXLD)

BULGARIA WRN began a DRM SW service to Europe in Feb, via Kostinbrod site here, initially scheduled with WRN English for Europe but to add other content: 0600-0800 11545, 0800-1600 15735, 1600-1800 11535, 1800-0600 5760 (WRN) But A-06 schedule may differ; maybe including WORLD OF RADIO Sats at 0800 (gh)

CAMEROONS [non] Changes of TDF transmissions via Armavir, Russia: Radio Free Southern Cameroons in English from Jan. 29: 1800-1900 new 11840, 500 kW, 235 degrees on Sundays only, ex 12130 300 kW (Observer, Bulgaria)

CHINA China Business Radio network via CNR-2 has an English Evening, very enjoyable

program, at 1300-1358, heard on 6155 and better on 6065, with business news, music, classroom, features from RCI in Canada. It's hosted M-F by John and Cynthia, and John has a blog, <http://ncjohn.blogchina.com/> which says that the last two weeks' shows are archived via <http://www.cnr.cn/wcm/fortune/english/> -- No English on Saturday, but on Sunday, different hosts, Alan Spear(?) and Joy. Following Saturday, also on 7140, 7245, including from 1328 Studio Classroom Online hosted by Vickie and Steve, produced in Taiwan, audio online at http://studioclassroom.com/sc/sc_radio.php (Ron Howard, CA, DXLD)

V. of Strait, 4940, used to have an English show, *Focus on China*, Sat & Sun 1430-1500, but not heard since March 2005; also listed on 6115, 7280, 11590 (Ron Howard, *ibid.*) Website shows time as 1430, but would that be local? = UT 0630 (Mauno Ritola, Finland, *ibid.*)

CUBA Following up last month's lead story, Radio República: we thought there was something odd about the "Central England" DF reported for R. República, since the only SW site fitting that description is Woofferton. Trouble is, WOF was originally for VOA relays to the eastern hemisphere, and looking thru the HFCC B-05 schedule, we find that the "largest" azimuth displayed for that site is 182 degrees, i.e. West Africa. Thus, unless of course, some changes have been made, it appears that WOF does not have an antenna suitable for Cuba. The other two VT sites in the UK, however, Skelton and Rampisham, both have a number of non-secret transmissions aimed at South, and Central America -- so more likely one of those was in use for R. República 6135/6010/7110. We asked monitors in England living near the sites to check out the RR signals, and got the following results (gh)

6135 is regularly a strong steady signal here in Crewkerne, Somerset, just 8 miles West from Rampisham (Chris Evans) In Letchworth Garden City it is weak, often barely audible. I emailed Mike Terry in Bournemouth who is about 30 miles to the East of Rampisham and the signal is 44444 there, just slight flutter so looks likely that the site is Rampisham (Mike Barraclough, *World DX Club*)

Meanwhile, 6010 at 00-02 was finally moved, to 7205 on Jan 31, followed by Cuban jammers within a couple of days, but some jammers remained still on 6010 as of mid-February, as R. Mil tried to convince their Cuban 'friends' to quit doing that (gh) Yet more jamming remained audible at least into Feb on 5965, which RR used only briefly at the outset, even though the only victim was RHC (Mark Taylor, WI, DXLD)

Meanwhile #2, the other R. República relay, to "Iceland," 7160 M-F 2300-0400 Tu-Sa, overtly via Germany, and brokered by RMI, turned out to be from the Nauen site rather than Jülich or the initial test at Wertachtal (Wolfgang Büschel, DXLD)

As above, IBB made major cuts in SW transmissions at the beginning of Feb. R. Marti had been an example of always 4 SW frequencies at a time, no more, no less. Now the max is 3, and in the 05-11 period, only 2. In the case of jammed services such as this, it is not advisable to reduce the number of frequencies. This allows the existing jammers to "gang up" even more against the remaining frequencies. Furthermore, abandoning the highest daytime frequency (17670) is not advisable, since the highest frequencies are most immune to jamming -- as long as they propagate (gh)

ETHIOPIA [non] 7175, Sat Feb 4 at 1730, V. of Somali People via Asmara, Eritrea. Clear signal (Mauno Ritola, Finland, DXLD) New clandestine

GERMANY IBB cuts make me wonder how long the Biblis site will stay in operation. Most of the day only a single transmitter (or nothing) is still on air, with the exception of just 2.5 hours. Could well be the most underused SW site in Europe now. Is the 75-metre capability of Biblis still of importance? If so, it could also be a scenario to keep Biblis and instead decommission Lampertheim (Kai Ludwig, Germany, DXLD)

GUATEMALA Radio Verdad, Chiquimula, 4052.5: on our new website you can find much data about Radio Truth, like our history, photographs, beautiful hymns in English and Spanish, news, the *Back to Jesus Broadcast* and many links from our listeners: <http://www.radioverdad.org> (Dr. Edgar Amílcar Madrid, Manager and Director, R. Verdad, DXLD) Beware: audio launches automatically.

Radio Cultural, TGNA 3300, has been off the air quite a while, explained by the station as caused by Hurricane Stan [early Oct 2005]. The SW antenna fell down and repairs are needed, but this is being delayed by problems needing attention at repeater stations. However, they are now webcasting via <http://www.radiocultural.com> (Manuel Méndez, Spain, DXLD)

ICELAND AFN heard on new 9340 USB at 1330, from where? (Steve Lare, MI, DXLD) ILG says Keflavik 10 kW, ex 13855 (Wolfgang Büschel, *ibid.*) 9340 very good here, but ex-9980 ex-13855, also on // 7590 (Noel R. Green, England, *ibid.*) 9340 heard at 19-22, then // 7590 (Bernie O'Shea, ON, DXLD)

INDIA AIR mailbag show heard on Mon at 1430 on 9690; what other times? (gh) Faithfully Yours, Mondays at 1030-1045 on 13710, 17510, and best: 17895 (to Oceania I guess); 1830-1845 on 7410, 9445, 9950, 11620 (to Europe); 2120-2135 on 7410, 9445, 9950, 11620 (Erik Koie, Denmark, DXLD)

INTERNATIONAL WATERS [non?] In the UT afternoon, on 9134.5 USB with loop tape in several local languages, not English, mentioning a phone number. One announcement, Hindi, Urdu or similar, mentioned "Coalition Ships." Sounded like tape was rewound after announcements with pip-like sound and then started again. No music (Jari Savolainen, Finland, DXLD)

Also on 9223 USB at 1600-1610, non-native English messages, probably pre-recorded, with warning against involvement in pirate actions off Somalia. "If you want a long happy life with your family, stop taking part in these illegal actions. We know who you are and where to find you." Several times the Coalition

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-06=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

Maritime Forces were mentioned and a telephone number and e-mail address in Bahrain with a request to give information about these pirates (Marten van Delft, Netherlands, via Max van Arnhem, HCDX) How do you get pirates to tune in 9223? (gh)

KOREA NORTH [non] According to Asian Broadcasting Institute, Investigating Commission of Missing Japanese Probably Related to North Korea announced they would begin programs in Korean, English, Chinese in their Shiohaze broadcast (1400-1500 & 1900-1930 on 5890) from the end of January, in addition to Japanese. English Tuesdays only 1430-1500, 1900-1930 (Takahito Akabayashi, Japan, DXLD) 5890, Tue at 1430, Shiohaze (Sea Breeze) via Irkutsk, Russia, English ID: "This is Shiohaze - Sea Breeze from Tokyo, Japan," then reading names of the missing persons year by year according to list on <http://www.chosa-kai.jp/indexeng.htm> (Mauno Ritola, Finland, DXLD)

LAOS Radio National Lao, 4678.01, 2305-2335 Laotian music (Wolf-Dieter Behnke, Germany, A-DX via BC-DX) 4678.2, Radio Luang Prabang, 0952-1002, Laotian, very nice song, 1000 news by woman (Arnaldo Slaen, Argentina, HCDX)

[non] Radio Free Laos? Former CIA head James Woolsey counsels Royal Lao Government in Exile "to strongly pursue plans for a radio program to be broadcast into Laos," citing the success of Radio Free Europe in undermining the Soviet Union, by spreading truth and information (RLGE press release via kimandrewelliott.com)

LESOTHO Have spoken to Mr. Monyane (C.E.) about the absence of SW from R. Lesotho. Their SW transmitter is over 20 years old and it is getting almost impossible to obtain spares. However, they have decided to get a new one as they would like to continue SW broadcasts. He can only order it in their new financial year which starts in April, and expects the new transmitter to be on air sometime in August/September (Vashek Korinek, RSA, via BCDX) was 100 kW on 4800

MALDIVES ISLANDS [non] Minivan Radio restarted SW for a week from Monday 23 January, focusing on protests across the country (Minivan News via Kevin Redding, AZ, ABDX) 1600-1700 on 11800 via Germany, but off again after that week (Jeff White, RMI) And back on again from Feb 9 (Observer, Bulgaria) and still on Feb 16 (Jose Jacob, India, DXLD)

MÉXICO [and non] For months, R. Insurgente, Zapatista clandestine, had claimed it broadcast on 6.0 MHz, Fridays at 3 pm. Finally in January it began to be heard by DXers around 2100 UT:

Already on 6000, at 2055 Friday with music, 2105 talking about the recently deceased Comandanta Ramona, peregrination around Mexico that Subcomandante Marcos has been making, and later a speech by Delegado Cero. Definitely R. Insurgente, first time I have heard it here in Mexico City, still a weak signal; went off at 2145 (Julián Santiago Díez de Bonilla, DF, condig list) I was monitoring at same time, but could hear only traces of talk, marred by data bursts every 17 seconds. Habana carrier came on at 2150 (gh, OK) Same date heard some Spanish talk 2110-2146 mixing with classical music from V. of Russia (Dave Valko, PA, CRW) Heard again the following Friday, but weaker, on 5999.98, 2100-2147 with info, music and commentaries (Santiago, condig list) And the Friday after that heard from 2040 to 2103 peaking at SINPO 4s. And the following Friday a little weaker than before (Julián Santiago Díez de Bonilla, DF, DXLD)

Saturday Feb 4 at 2030 I heard classical music and operatic arias on 6045 from XEXQ, Radio Universidad de San Luis Potosí, peaking at SINPO 5, audible as late as 2330 when adjacent QRM overtook. Three weeks before, Lic. Leticia Zavala, director, told me they had been down since the beginning of November due to technical difficulties. Very good reception for 250 watts at 400 km, also heard at 1330 and another day at 1630 with SINPO 4 (Julián Santiago Díez de Bonilla, DF, DXLD) Should be possible here after Italy closes at 2150 until 2300 when China relay comes on 6040, but no sign of it; in the 1330-1500 period had a subaudible heterodyne, probably with China or India on 6045, fluctuating between 0 and some 20 Hz due to unstable transmitter; finally a bit of classical violin music after 1500 (gh, OK)

Radio UNAM: another month went by and still not back on 9600 as of mid-Feb (gh) We are making preparations to return to SW 9600 shortly (Ing. Armando Trujillo Pantoja, XEYU, Feb 10 to David Fogarty, DXLD) Good news, but with 9600 occupied by Habana, you should get a different frequency if at all possible (Fogarty to Trujillo, *ibid.*) Delayed by remodeling radio building, to continue this year, but they hoped to start testing soon from the Ticomán transmitter site, says Ing. Mejía (Julián Santiago Díez de Bonilla, DF, mid-Feb, DXLD)

XERTA, 4810, has been off the air, as they are in process of changing antenna location; streaming though at <http://www.xertaradio.com> (Ron Howard, CA, DXLD) First it was on Ajusco volcano SE of Mexico City, then they absurdly moved it to the downtown studio location, and since that was no improvement they are moving it again to the TV antenna farm on Chiquihuite peak N of the city (Andrés Cruz via Julián Santiago, *ibid.*)

PAKISTAN R. Pakistan, Quetta, nominal 5027, has been varying up and down: 5033.6, 0305-0410* news in English // 4790; 0310 own program with vernacular announcement and native songs (Anker Petersen, Denmark, DSWCI DX Window) and down to 5024 morning and evening (Chris Greenway, Islamabad, DXLD) 5022.8 at 1445 (Mauno Ritola, Finland, *ibid.*) Drifting around 5023 at 17 in mid-Feb (Jouko Huuskonen, Finland, *ibid.*)

PERÚ On 5700, Radio Triple SH, San Ignacio at 0148-0232* in mid-Jan, reactivated frequency, new name! Ex-Radio Frecuencia San Ignacio; long stretches of music with some comunicados, lots of ads. 'Triple' refers to their FM 99.6, MW 1200 and SW 5700 (Rafael Rodríguez R., Bogotá, condig list)

Alfredo Cañote reports a new station varying 6060.8 to 6061.2 kHz, Radio Sinaí, QTH: Jr Abtao 287 Cercado, Huánuco, Huánuco, Perú; Phone (62) 51-6288, e-mail radioisinaí21@hotmail.com General Manager is Rubén Matías López (Arnaldo Slaen, Argentina, HCDX)

Radio Oriente, Yurimaguas, has a new website at <http://www.radiooriente.org/> with streaming. Until then I was glad to host a site for them on DXing.info (Mika Mäkeläinen, Finland) 6188v

ST. HELENA Our project to put Radio St. Helena back on SW and revive the famous "RSH Day" interactive broadcasts is still a dream, but day by day is coming closer. We need donation of a 1000 watt ham transmitter such as used Yaesu FT-757GXII, outdoor antenna system with concrete base, and associated equipment. More at <http://www.sthelenase.radio> (Robert Kipp, via Walt Salmaniwi, BC, DXLD) Bank accounts for donations have been set up in USA, Europe (gh)

SLOVAKIA As announced on the Letters from Listeners program on RSI, SW broadcasts will continue during 2006; thus the threat of closure has been put off during this year. Andrés Bernate, in answering several letters from listeners about the possible closure, said Spanish SW transmissions would continue following government approval of a considerable sum which guaranteed continuation of the SW service, and lessened the possibility of transmitting only on internet. He expressed thanks for the great quantity of letters received protesting the possible closure (José Miguel Romero, Spain, DXLD)

SOLOMON ISLANDS SIBC Honiara, 5020, again using // 9545, but clashing with DW at 07-11. Supposed to be daytime-only frequency; bad modulation (Barry Hartley, NZ, BCDX) Good at 1053 on 9543.30 // 5020 (Tony Magon, NSW, HCDX) Also here on 9543.30, very muffled audio at 1124-1200 (Chuck Bolland, FL, DXLD) Adrian Sainsbury visited SIBC and tells me that 9545 will become a DRM transmission for relay by remote SIBC relay stations in the Solomons (Barry Hartley, NZ, BCDX)

SOMALIA [non] R. Waaberi, only half an hour a week, Fri 1330 on 17660 via Germany, found itself in the middle of the Libyan jamming wars, when Sawt al-Amal started daily broadcasts on that frequency at 12-14; See lead story above.

SUDAN [non] BBC World Service Trust launched *Darfur Salaam*, a humanitarian radio program, Friday 20th January, at 0500-0515 via Cyprus on 11820, repeated at 1700-1715 on 9640, including five minutes of news from the BBC Arabic Service (BBCWS Trust) Then daily or weekly?

SWEDEN For four days in late January, numerous transmissions of R. Sweden as well as R. Netherlands and RCI relays via one Hörby transmitter were all monitored 700 Hz below their nominal frequencies (Observer, Bulgaria)

TAIWAN According to Mr. Shigenori Aoki, Fu Hsing Broadcasting Corporation, Taipei changed Jan 1 from 15250 to 5995 and 9410, at 2300-0100, 0400-0600, 0800-1000, 1100-1500. Good reception here in Japan, but 5995 blocked by VOR Japanese from 1200. Web site <http://www.fhbs.co.tw> did not work, changed to <http://www.fhbs.com.tw> saying service is to Mainland in one-hour segments, also webcast (Takahito Akabayashi, Tokyo, Japan, DXLD) China also moved onto 9410 (gh)

Aoki also reports, Kan Sheng Broadcasting Station's SW service for Chinese mainland, on 9745 expanded to 24 hours, filling in gap at 0105-0655. QRM with HCJB-Quito. Same as internet broadcast ("Program for Mainland China") at <http://www.voh.com.tw/ENGLISH/MAIN-E-HTML> where there is no mention of 9745 (Takahito Akabayashi, Japan, DXLD)

TAJIKISTAN unID on 9270.15 at 1550, with talk and short bits of Asian music (Leif Råhäll, Sweden, SW Bulletin) Tajikistan signed on at 1400 on 4635.065 kHz and so did the 2nd harmonic on 9270.13 (Mauno Ritola, Finland, DXLD)

UGANDA [non] Radio Rhino International Africa in English from Jan. 9 expanded from Wed/Fri to M-F, 1500-1530 on 17870 via Jülich, 100 kW, 145 degrees (Observer, Bulgaria)

UKRAINE From February 1, RUI at 0000-0500 to North America is on 5880 instead of 5910. Thank you very much for help, and we shall be very grateful for your comments to our reception conditions in America (Alexander Yegorov, RUI, DXLD) Weak here on 5880 from 0000 but in the clear and nothing on either side, so seems like a winner, ex-5910. Glad you found my suggestion usable. Hope your signal will pick up as spring approaches, but I suppose you will be looking at a higher band for A-06, won't you? (gh to Alexander Yegorov, RUI) Yes, presumably 7440 kHz, the last season A05 frequency (Yegorov, DXLD) English at 01 and 04, shifting to 00 and 03 UT for summer. Mailbag show said so many weekend repeats were due to lack of access to recording studios; hoped to do new shows more often, every two weeks (gh)

UK VT Communications has purchased and is installing a new DRM transmitter for Woofferton. We have also purchased a 100 watt transmitter for local coverage on the 26 MHz band in London (The oracle, VT Communications magazine via Mike Barraclough, WDXC) See also CUBA [non]

USA WRMI has a brand new Sommer antenna for NAm on 7385, like the old one damaged by hurricane, but improved; can you tell any difference? (Jeff White, WRMI) Yes, 7385 is quite a bit stronger now (gh, OK)

[non?] Heard NPR on 4156 SSB at 1205. New AFRTS frequency? Location? (Marcelo Toniolo, New Zealand, dxing.info) see also ICELAND

VENEZUELA Radio Amazonas, Puerto Ayacucho, nominal 4940, keeps jumping around the 60m band (gh) at 1054 on 4920, other days around 1030 on 4892 (Fernando Viloria, Venezuela, DXLD) And later in January at 2230-2404 distorted on 4885.2 interfering with R. Clube do Pará, Brazil, then to 4887.5; a week earlier was on 4855.1 (Adán González, Venezuela, DXLD)

Until the Next, Best of DX and 73 de Glenn!

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

0000 UTC on 9736.5

PARAGUAY: Radio Nacional. Spanish identification, "Radio Nacional del Paraguay/Juntos Podemos," plus frequency. Public service announcement "Woman's Rights by Secretaria de la mujer y la Emisora." National news and sports update. (Fernando Garcia, Baltimore, MD)

0007 UTC on 4635

TADJIKISTAN: Radio Dushanbe. Vernacular. News bulletin and talk segments from two male announcer. SINPO 24442. (Arnaldo Slaen, Buenos Aires, Argentina)

0030 UTC on 9600

CUBA: Radio Habana Cuba. Round table with Castro, "Agenda Year 2006 The Energy Revolution," to end the sales of expensive kerosene for the use of cooking. Announcer noted, "We are not Saudi Arabia, we are in transition of installing of electric generators by the first semester." Announcer noted there would be more blackouts and shortage of light bulbs, which brought panel laughter. (Garcia, MD)

0048 UTC on 6973

ISRAEL: Galei Zahal. Electronic dance music with two announcers' Hebrew text between music tunes. (Joe Wood, Greenback, TN) 6973, 0046+ (Harold Frodge, Midland, MI) **Kol Israel** (Hebrew) 7545, 0230. Music oldies, promos, jingle ads to ID at 0300 and three minutes of news. (Slaen, ARG)

0151 UTC on 6150

COSTA RICA: University Network. Ragtime music to canned promo and phone number for reservations to late Doc Scott's Sunday Cathedral service in Los Angeles. Monitored 9725 at 0357 with text on Joshua from Doc's audio library. Audible 13750, 1914-1940 with female's religious text // KAIJ 13815 // WWC 13845. (Wood, TN) Female was most likely his widow who's taken up the reins. GVH. Costa Rica's **Faro del Caribe** 5054.6, 1145 with ID and frequency "1080 kHz AM, 97.1 FM" mentioned. (Garcia, MD) 5055, 0617-0628 with adult contemporary music into Spanish announcements and ID at 0628. (Wood, TN)

0200 UTC on 5400LSB

ARGENTINA: Radio Continental. Spanish ID: "Continental la Radio" into "Continental informa news headlines." Audible 15820LSB, 2230; **RAE** 15345, 2235; **Radio Maranata** via **Radio Baluarte**, Pto Iguaza, Argentina 6214.8 at 2315. (Garcia, MD) **Radio Rivadavia** 15820LSB, 1903-1915+. Weak and poor signal. (Frodge, MI)

0252 UTC on 4865

BRAZIL: Radio Alvorada. Portuguese. Tune-in to religious segments and hymns. Announcer's occasional pause for identification. (Tom Banks, Dallas, TX) Brazilians monitored in Portuguese: **Radio Brasil Central** 11815, 0130. (Garcia, MD) **Radio Clube do Para** 4885, 0510; **Radio Trans Mundial** 11735, 1848-1859. (Wood, TN) **Radio Rural Educacao Rural** 4754.9, 0533-0538+ (Frodge, MI) **Radio Guarujá Paulista** 5940, 0545. (Jerry Berg, Lexington, MA/NASWA Flash Sheet) **Radio Nacional** 11780, 2109-2133 (Wood, TN) **Radio Record** 6149.8, 2207-2221 (Rich D'Angelo, PA/NASWA Flash Sheet) **Radio Bandierantes** (tent) 6090, 2224-2229. (Frodge, MI) **Radio Cultural Araraquara** 3365.1, 2352-0005. (D'Angelo, PA)

0428 UTC on 9955

CLANDESTINE: Radio República via Radio Miami Int'l. Spanish talk and ID, "Esta es Radio Republica" at 0430. Brief Cubano vocal selection and announcer's on the air phone conversation. (D'Angelo, PA; Garcia, MD) **Radio Minivan** broadcast irregularly, noted on 11800 via Jülich, Germany 1600-1700. **Radio Rhino International** via Jülich, Germany, 17870, 1500-1530. (Banks, TX) via Samara, Russia 7590, *1730-1800*. (Tom Banks, Dallas, TX) **Radio Nile** via Madagascar 12060, 0433-0440. (Slaen, ARG) **Radio Payam E Dost/Bahai Radio** via Moldova 7460, 0230 with sign-on ID, Arabic news, vocals and prayers to 0315*. (Garcia, MD)

0443 UTC on 7200

SUDAN: SNBC. Arabic text to very nice local songs. Announcements by female, mentions of Omdurman with SINPO 23432. **Sudan**

Radio Service (via UK) 9525, 0500-0505 with Arabic identification and local music. News bulletin by female including several IDs and mentions of "Sudania." (Slaen, ARG)

0500 UTC on 9410

?? LOCATION: BBC World Service. *World Today* segment and sports wrap-up to newscast at 0600 possibly targeted to Middle East or Europe. BBC (Brad Rutherford, Leesburg, GA) *Transmitter site unknown during this time, as there are multiple sites*-GVH. **BBC via Seychelles** 11680, 1657-1700*, mentions of soccer rivals Manchester United and Birmingham City. BBC identification with freqs and program schedule. **BBC via Ascension Islands** 15400, 2035-2041 and 15105 at 1658. (Wood, TN)

0600 UTC on 3291

GUYANA: Voice of. Fair reception for BBC's newscast relay. Focus on cell phones and BBC's *World Today* segment, followed by selections of Hindi ethnic music. (Rutherford, GA) 0520-0531+ with BBC World Service promo, signal slightly cleaner in USB. (Frodge, MI) 0800 with five minutes of news into Pentecostal Church sermon and hymns. (Garcia, MD)

0952 UTC on 5952.5

BOLIVIA: Radio Pio Doce. Religious talk in Quecha language to station ID at 0954. Mentions of upcoming noticias program (news) to discussion group's Spanish comments. Quecha at 1028 recheck. Bolivians in Spanish heard: **Radio San Miguel** 4903.9, 1028-1040. (D'Angelo, PA) **Radio Reyes** 4409.92, 2350-2355; **Radio Paititi** 4684.67, 0015-0020. (Slaen, ARG)

1000 UTC on 5910

COLOMBIA: La Voz de tu Conciencia. Spanish relay of Marfil Estereo 88.8 FM. Colombian talk and folk music to IDs and time checks. Colombia's **Radio Lider** 6139.8, 1015 "noticias nacionales," time check into "Servicios Sociales." (Garcia, MD) HCJU Radio Lider 6139.8, 0556-0602+. "Desde Bogotá, transmite Radio Lider Melodia HCJU." (Frodge, MI)

1120 UTC 17885

KUWAIT: Radio Kuwait. Tagalog. Programming targeted to the Philippines via male and female announcer duo. Interference from BBC observed. (Slaen, ARG)

1310 UTC on 11850

POLAND: Radio Polonia. Polish politics to *News From Poland*. Contest at 1326 to music and talks featuring Henrich Goresky and *Soundcheck* - a 20 minute program of Polish music. (Scott Barbour, Intervale, NH)

1440 UTC on 11675

CHINA: China Radio Int'l. Western sounding male/female's commentary to Chinese bumper music. Tough copy SIO 1+52. China monitored as; **Central People's BS** (Chinese) 6950, 2022-2314. (Frodge, MI)

1700 UTC on 21535

MADAGASCAR: United Nations Radio. French identification to news item about Afghanistan and Pakistan. Station identification at 1705, "Ici United Nations Radio." (Slaen, ARG)

1901 UTC on 11865

PORTUGAL: Deutsche Welle relay. *Newsline* program to mentions of US military presence in Afghanistan. Continued talks on Israeli actions in the Gaza strip and the European Space program. Station ID at 1904. (Wood, TN)

2155 UTC on 5005

EQUATORIAL GUINEA: Radio Nacional. Spanish. African ethnic music into 2200 local news of university calendar, agriculture, judicial and social services items to 2208. Fifty-one minutes of local music into ID, "Radio Dos, Bata," closing with national anthem at 2259. (Garcia, MD)

*Thanks to our contributors - Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
English broadcast unless otherwise noted.*

From Under the Southern Cross

Two of the world's major international English language broadcasters originate from the South Pacific. Radio Australia and Radio New Zealand International offer some top notch programming, as well as news and perspectives from a region of the world not often covered by the North American media.

Although neither of these stations specifically targets North America with its shortwave transmitters, both are rather reliably heard on the West Coast throughout the year. For those of us situated more to the east, opportunities to hear RA and RNZI (via shortwave) are considerably more rare, especially during Northern Hemisphere winter. Decent reception during this season is mostly confined to a few hours during our local mornings. It certainly has not been helpful that we seem still to be wallowing at solar minimum, a period during old Sol's eleven year cycle that makes even the most dedicated shortwave listener consider other, less frustrating activities.

However, spring commences another, more welcome cycle: an upswing in reception from those two shortwave stations originating from under the Southern Cross. The phenomenon is especially noticeable in eastern regions of this continent as RA and RNZI become more frequent companions during our evenings, something just about unheard of (pun intended!) when the snow and chill winds are flying in most places here. So, April may be an opportune time to detail just what these two stations have on offer.

RADIO AUSTRALIA

www.radioaustralia.net.au

After its near-death experience in the mid-'90s, RA has re-emerged as a strong and influential international voice in south and southeast Asia and the Pacific island nations. Recent global and regional events have convinced a government that had been indifferent and even hostile toward international broadcasting of the latter's useful role in the ongoing regional and global debate over ideas and ideals. While expanding its presence via satellite and on local, domestic AM and FM stations and frequencies throughout the region, RA has retained a full time English language service on shortwave and the internet, as well as targeted radio and internet services in Bahasa Indonesian, Khmer, Mandarin, Tok Pisin and Vietnamese. There also is a newly relaunched satellite television venture that is being carefully nurtured in a very deliberate fashion after earlier efforts in this regard proved unsuccessful.

As part of further developing its mission,

Radio Australia has recently introduced programs specifically designed for its Asian and Pacific listeners. These new radio programs have been coordinated with supporting internet pages that include print and on-demand audio material.

For North American listeners, RA's special value lies in this informed focus on parts of the world usually given short shrift in our media, as well as its broadcast of a number of unique, specifically focused programs about science, health, the arts, religion, social history and current affairs, backed by first-class research and presented by some of Australia's leading broadcasters. This is not a station that "dumbs down" its programming or talks down to its listeners. On the contrary, it assumes that its listeners want to be challenged and consistently sets out to accomplish that mission.

The section below provides a listing of all the programs broadcast in the English Service. The menu is a mix of programs produced by the domestic ABC Radio National, ABC Classic FM and ABC Local Radio networks, and features produced by and specifically for RA. Programs designated *for Asia* are broadcast on shortwave frequencies targeting Asia (labeled "as" in *MT's Shortwave Guide*) as well as on the internet streaming service. The programs designated *for the Pacific* are broadcast on shortwave frequencies targeting the Pacific (labeled "pac" in *MT's Shortwave Guide*).

In addition, nearly every program is available via audio on-demand through a link provided on the Radio Australia internet site. Furthermore, many programs are archived and several are being offered for podcast. Even if you don't have access to the Internet, the list below offers several broadcasts of most programs which should assist in finding a time where good reception and your personal schedule coincide.

Radio Australia is also available to North American listeners, albeit in a more limited way, via Sirius Satellite Radio on the World Radio Network channel (stream 140) and across Canada via CBC Overnight. These broadcasts were already detailed in February's column.

DAILY PROGRAM SCHEDULE

(News on the hour)

(SUNDAY)

00:00

The Spirit of Things - An adventure into religion and spirituality.

01:00

Grandstand - Live sport from around the country with an emphasis on cricket.

07:00

Grandstand Wrap - A round-up of today's sports results and news.

07:30

Rear Vision - Where we've been, where we are today and where we might be going.

08:00

Correspondents' Report - The ABC's overseas reporters interpret and analyse the week's major events.

08:30

Innovations - A showcase of Australian design, discovery, invention, engineering and research skills.

09:00

The Music Show - It's more than just music, and it's more than just talk.

11:00

Sunday Profile - An in-depth analysis of the major news in Australia and around the world.

11:30

Speaking Out - A program about Aboriginal and Torres Strait Islander people.

12:00

Sunday Nights - A unique weekly program exploring the issues, events and people driving developments in religion, ethics, spirituality, popular culture, values and beliefs in our country.

16:00

The Science Show - Scientific issues, debates, events, personalities, and discoveries.

17:00

In the Loop - Linking our Pacific neighbors with a lively mix of music, talk and the sounds of Oceania.

17:30

The Sports Factor - Debate and celebrate the cultural significance of sport.

18:00

Pacific Beat - Morning Edition - News and current affairs about the Pacific

21:00

AM - Australian national current affairs.

21:30

RNZI Dateline Pacific - News and Current Affairs from Radio New Zealand International.

22:00

AM - Australian national current affairs.

22:40

Breakfast Club - Making connections across Asia and the Pacific.

23:00

Connect Asia - News, views and analysis on the stories that matter in Asia.

(MONDAY-FRIDAY)

00:00

Breakfast Club - Making connections across Asia and the Pacific.

02:00

The World Today - A comprehensive current affairs program which backgrounds, analyses, interprets and encourages debate on events and issues of interest and importance to all Australians.

03:00

Sport - Regional sports news.

03:15 for Asia

(M) In Conversation - Conversations with scientists, and those interested in the subject, about what it's meant in their lives.

(T) Ockham's Razor - Thoughtful people have their say.

(W) Lingua Franca - Aspects of language.

(H) The Ark - The programme shatters the usual perception of the past and illuminates the present.

(F) Talking Point - Listen, learn and be entertained.

03:15 for the Pacific

In the Loop - Linking our Pacific neighbours with a lively mix of music, talk and the sounds of Oceania.

03:30 for Asia

(M) The Health Report - Making medicine understandable.

(T) The Law Report - It's all about the law makers

and the law breakers.
(W) The Religion Report - Religious affairs in Australia and around the world.
(H) The Media Report - Essential listening if your work in the media industry or are interested in the future of the media.
(F) The Sports Factor - Debate and celebrate the cultural significance of sport.

04:00 for Asia
(M) The National Interest - The major issues of the week.
(T) Counterpoint - A commentary programme to make you think!
(W) Rear Vision - Where we've been, where we are today and where we might be going.
(H) Background Briefing - Award winning investigative journalism.
(F) The Science Show - Scientific issues, debates, events, personalities and discoveries.

04:00 for the Pacific
In the Loop - Linking our Pacific neighbours with a lively mix of music, talk and the sounds of Oceania.

05:00 for Asia
The World Today - A comprehensive current affairs program which backgrounds, analyses, interprets and encourages debate on events and issues of interest and importance to all Australians.

05:00 for the Pacific
Pacific Beat - Afternoon Edition - News and current affairs about the Pacific.

05:30 for the Pacific
Sport - Regional sports news.

05:35 for the Pacific
Pacific Beat - On the Mat - Pacific chat.

06:00
Sport - Regional sports news.

06:15
Talking Point - Listen, learn and be entertained.

06:30 for Asia
(M) The Health Report - Making medicine understandable.
(T) The Law Report - It's all about the law makers and the law breakers.
(W) The Religion Report - Religious affairs in Australia and around the world.
(H) The Media Report - Essential listening if your work in the media industry or are interested in the future of the media.
(F) The Sports Factor - Debate and celebrate the cultural significance of sport.

06:30 for the Pacific
RNZI Dateline Pacific - News and Current Affairs from Radio New Zealand International.

07:00 for Asia
Life Matters - A unique daily interview program about social change and day-to-day life.

07:00 for the Pacific
Pacific Beat - Afternoon Edition - News and current affairs about the Pacific.

07:30 for the Pacific
Sport - Regional sports news.

07:35 for the Pacific
Pacific Beat - On the Mat - Pacific chat.

08:00
PM - A comprehensive current affairs round-up.

09:00
Australia Talks Back - A daily national talkback programme.

10:00
Asia Pacific - Current affairs program for Asia and the Pacific

10:30
(M) The Health Report - Making medicine understandable.
(T) The Law Report - It's all about the law makers and the law breakers.
(W) The Religion Report - Religious affairs in Australia and around the world.
(H) The Media Report - Essential listening if your work in the media industry or are interested in the future of the media.
(F) The Sports Factor - Debate and celebrate the cultural significance of sport.

11:00
Sport - Regional sports news.

11:10
PM - A comprehensive current affairs round-up.

12:00
Late Night Live - Talk radio with a difference.

13:00
Asia Pacific - Current affairs program for Asia and the Pacific

13:30
(M) Innovations - A showcase of Australian design, discovery, invention, engineering and research skills.

(T) Australian Express - Climb aboard to learn more about Australia and what makes it tick.
(W) Rural Reporter - Stories from the bush.
(H) Rear Vision - Where we've been, where we are today and where we might be going.
(F) All in the Mind - A weekly foray into the mental universe, the mind, brain and behaviour.

14:00
(M) Big Ideas - Big Ideas brings you lectures, conversations, features and special series from Australia and around the world.
(T) AWAYE! - Indigenous issues and arts.
(W) All in the Mind - A weekly foray into the mental universe, the mind, brain and behaviour.
(H) Hindsight - The focus is exclusively on social history.
(F) MovieTime - A program for everyone who loves movies-reviews, interviews and behind the scenes.

14:30
(W) The Philosopher's Zone - Explore the big philosophical questions and arguments.
(F) Arts on RA - The arts in action in Australia.

15:00
Asia Pacific - Current affairs program for Asia and the Pacific

15:30
(M) The Health Report - Making medicine understandable.
(T) The Law Report - It's all about the law makers and the law breakers.
(W) The Religion Report - Religious affairs in Australia and around the world.
(H) The Media Report - Essential listening if your work in the media industry or are interested in the future of the media.
(F) The Sports Factor - Debate and celebrate the cultural significance of sport.

16:00
Australia Talks Back - A daily national talkback programme.

17:00
(M) Innovations - A showcase of Australian design, discovery, invention, engineering and research skills.
(T) Australian Express - Climb aboard to learn more about Australia and what makes it tick.
(W) Rural Reporter - Stories from the bush.
(H) Rear Vision - Where we've been, where we are today and where we might be going.
(F) Big Ideas - Big Ideas brings you lectures, conversations, features and special series from Australia and around the world.

17:30
(M-H) In the Loop - Linking our Pacific neighbours with a lively mix of music, talk and the sounds of Oceania.

18:00
(M-H) Pacific Beat - Morning Edition - News and current affairs about the Pacific.
(F) Pacific Review - The week that was in the Pacific.

18:30
(F) Australian Express - Climb aboard to learn more about Australia and what makes it tick.

19:00
(F) Asia Pacific Review - A roundup of this week's regional current affairs.

19:30
(F) Rural Reporter - Stories from the bush.

20:00
(F) Correspondent's Notebook - A personal perspective on a major news story or current issue from the Asia Pacific region.

20:10
(F) Saturday AM - Australian national current affairs.

20:30
(F) Saturday Extra - A lively array of stories and features covering a range of topics including international politics and business.

21:00
(M-H) AM - Australian national current affairs.

21:30
(M-H) RNZI Dateline Pacific - News and Current Affairs from Radio New Zealand International.

22:00
(M-H) AM - Australian national current affairs.
(F) In the Loop - Linking our Pacific neighbours with a lively mix of music, talk and the sounds of Oceania.

22:30
(F) Talking Point - Listen, learn and be entertained.

22:40
(M-H) Breakfast Club - Making connections across Asia and the Pacific.

23:00
(M-H) Connect Asia - News, views and analysis on the stories that matter in Asia.
(F) Asia Pacific Review - A roundup of this week's

regional current affairs.

23:30

(F) Australian Express - Climb aboard to learn more about Australia and what makes it tick.

(SATURDAY)

00:00

Pacific Review - The week that was in the Pacific.

00:30

Asia-Pacific Business - A weekly wrap of finance & corporate news from the Asia Pacific region.

00:45

Talking Point - Listen, learn and be entertained.

01:00

Grandstand - Live sport from around the country.

07:00

Grandstand Wrap - A round-up of today's sports results and news.

07:30

Rural Reporter - Stories from the bush.

08:00

Asia Pacific Review - A roundup of this week's regional current affairs

08:30

Jazz Notes - Australian jazz.

09:00

The Margaret Throsby Interview - Conversation and music.

10:00

Asia-Pacific Business - A weekly wrap of finance & corporate news from the Asia Pacific region.

10:20

Talking Point - Listen, learn and be entertained.

10:35

Verbatim - Verbatim charts the story of the 20th century through the voices of ordinary Australians.

11:00

Asia Pacific Review - A roundup of this week's regional current affairs

11:30

All in the Mind - A weekly foray into the mental universe, the mind, brain and behaviour.

12:00

Correspondent's Notebook - A personal perspective on a major news story or current issue from the Asia Pacific region.

12:10

Saturday Night Country - The music, the personalities and the very latest news from the Australian and international country music scene.

16:00

The Margaret Throsby Interview - Conversation and music.

17:00

Late Night Live - Talk radio with a difference.

18:00

Correspondents' Report - The ABC's overseas reporters interpret and analyse the week's major events.

18:30

Australia All Over - An eclectic mix of music, poetry, anecdotes, book readings and talkback.

22:00

Correspondents' Report - The ABC's overseas reporters interpret and analyse the week's major events.

22:30

Innovations - A showcase of Australian design, discovery, invention, engineering and research skills.

23:00

Background Briefing - Award winning investigative journalism.

23:55

Perspective - Expert commentary.

[Source: www.radioaustralia.net.au]

The Australian Broadcasting Corporation has a visually attractive, easy to use comprehensive internet web site www.abc.net.au with extensive audio, video and text material on a wealth of subjects. www.abc.net.au/radio/ provides live streams for seven networks or stations in addition to Radio Australia. These are the ideas network ABC Radio National, the classical music network ABC Classic FM, the youth network Triple J, the contemporary new indie music network Dig, the continuous news network ABC NewsRadio and two ABC Local Radio outlets - 720 ABC Sydney and ABC Coast FM.

Next month, we'll profile and detail RNZI.

New QSLing Opportunities

Here is a great way to collect a bevy of colorful QSL cards and expand your knowledge on Taiwan's traditional activities. Radio Taiwan International is issuing monthly a colorful card that represents Taiwan's culture, customs and traditional ceremonies. Send your reports to: P.O. Box 24-38 (or) P.O. Box 24-777, Taipei 10651, Taiwan, Republic of China.

Radio Prague has a new series of eight QSL cards on the theme of *Czech Scientists and Inventors*. For a sneak peak of their colorful series go to: www.radio.cz. Letters or reports to: Vinohradská 12, 12099 Prague 2, Czech Republic.

The Croatian Amateur Radio Association will celebrate the 150th anniversary of the birth of inventor and scientist Nikola Tesla. Special event station 9A150NT will



be active on all bands and modes from Croatia during 2006, and will be on the air each month from a different county in Croatia. More details about this special call sign and the Nikola Tesla Award can be found at: <http://www.inet.hr/9a6aa/9a150nt>. Contacts with 9A150NT will be valid for the Worked 9A Counties Award.

The International Shortwave League is celebrating their 60th Diamond Anniversary this year. Look for special event station GB60SWL to be active one day per month at public events or rallies around the United Kingdom. A few planned events include hamfest, conventions, and *Evanston Castle Rally*. Full details can be found at: www.iswl.org.uk

Missionary broadcaster HCJB World Radio celebrates their 75th anniversary in 2006. Look for special events throughout the year to commemorate this event. Their featured link *Our 75th Anniversary* at: www.hcjb.org will continue to add articles, resources and event announcements so that you can participate in this special milestone. Reports with return mint Ecuadorian stamps, an IRC or \$1.00 are required and should be sent to: Casilla 17-17-691, Quito, Ecuador.

ALBANIA

China Radio International via Cerrik, 6020, 9570 kHz. Full data *Endangered Rare Animal Series* card, with site notation. Received in 45 days for an English report. Station address: 16A Shijingsham Street, Beijing 100040 China. Web: www.chinabroadcast.cn. English reception reports: crieng@cri.cn (Edward Kusalik, Alberta, Canada)

AMATEUR RADIO

Croatia-9A0C1, 20 meters SSB. Full data color photo card from HA3KNA via ARRL bureau. Sveti Nikola Island IOTA EU-110. (Larry Van Horn, NC)

Japan-JF2EPL, (IOTA AS-025 JCG#20008) 10 meters SSB. Full data plain ARO card. Received in 339 days via ARRL bureau. (Van Horn NC)

Kuwait-9K2HN, 12 meters SSB. Full data color card. Received in 17 days (no request sent) QSL address: Hamad Al-Nusif, P.O. Box 38305, Abdullah Al-Salem Area, 72254 Kuwait. (Van Horn, NC)

ASCENSION ISLAND

Star Radio, Liberia via Ascension Islands, 11965 kHz. Plain, full data card signed by Mr. Darcy Christian, Program Officer. Received in 57 days for an English report and two IRCs. QSL address: Foundation Hiron-delle, Rue Traversiere 3, CH-1018 Lausanne, Switzerland. (Bill Wilkins, Springfield, MO) Email: starradio_liberia@yahoo.com (or) info@hirondele.org

CLANDESTINE

Little Saigon Radio (via Taiwan) Full data multicolored card signed by Joe D. Dinh. Received in 63 days for an English report. QSL address: 15781 Brookhurst Street-Suite 101, Westminster, CA 92683. Web: www.littlesaigonradio.com (Kusalik, CAN)

COLOMBIA

La Voz de tu Conciencia, 6010 kHz. Full data QSL card signed by Martin Stendal, plus pennant and greeting card signed by DXer Rafael Rodriguez. Received in two months via snail mail for an email report to: contacto@fuerzadepaz.com Station address: Calle 44 No. 13-67, Bogotá D.C. Colombia. (Arnaldo Slaen, Buenos Aires, Argentina)

CZECH REPUBLIC

Radio Prague, 6200 kHz. Full data Czech Spas QSL card signed by "Bab", plus frig magnet and program schedule. Received in 18 days for an English report using the reception report format from station website at: <http://www.radio.cz/en/> Station address: Vinohradská 12, 12099 Prague 2, Czech Republic. (Larry Zamora, Garland, TX)

GERMANY

MV Baltic Radio 6045 kHz. Full data computer generated QSL card of Helligendamm at the Baltic Sea, with personal note signed by Roland Rohde. Received in 26 days for a German report and two return mint German stamps. QSL address: R&R Medi-enservice, Roland Rohde, Seestrass 17, 19089 Göhren, Germany. (Martin Schoech, Germany) Web: www.mvbalticradio.com MV (possibly Mecklenburg-Vorpommern) Baltic, was previously known as Stör-Sender, and has been logged on 6045 kHz, transmitting via T-Systems International in Jülich, Germany, (previously Riga-Ulbroka site) on the first Sunday of every month at 1200 UTC. - GVH

KUWAIT

IBB Kuwait Transmitting Station, 6235 kHz. Full data verification letter from Kuwait, signed by George Miller-Transmitting Plant Supervisor. Received in 44 days for an English report. QSL address: Kuwait Transmitting Station, c/o American Embassy-Bayan, P.O. Box 77, Safat, 13001 Kuwait. (Kusalik, CAN)

MEDIUM WAVE

KCMD, 970 kHz AM. Full data prepared QSL card verified with illegible signature. Received in three days after follow up report. Station address: CBS Radio, 1501 SW Jefferson St., Portland, OR 97201. (Patrick Martin, Oceanside, OR)

KKLF, 1700 kHz AM. Printable e-mail QSL from Hubert R. Beavers-Technical Dept. Received in five days for a cassette tape of Special DX Test. QSL confirms 1 kW from the transmitter site in Lucas, Texas. Station address: 3500 Maple Ave.-Suite 1600, Dallas, TX 75210. (Patrick Griffith, Westminster, CO) QSL certificate in 32 days for CD report. (Martin, OR)

KNNZ, 940 kHz AM. Cedar City, Utah. Full data prepared QSL card verified and signed by Brently Niemeth-Operations Manager. Received in 14 days after last followup. Total time 358 days and two previous followup reports. Station address: 251 Hilton Drive # 200, St. George, UT 84770-2201. (Martin, OR) Web: www.mbbroadcasting.com/cnn/

WOI, 640 kHz AM. Full data verification on station letterhead signed by David Knippel, Chief Operator, plus program schedule, frig magnet, decal and 2006 calendar. Received in eight days for an AM report. Station address: Iowa State University, 204 Communications Bldg., Ames, IA 50011. (Wilkins, MO) Interesting feature on the history of WOI...GVH at: www.iastate.edu/~woi/history/history.html

UNITED KINGDOM

Eglise du Christ, via Wofferton, UK-Merlin Communications, 7260 kHz. Verification letter signed by Jean Grenier. Received in 24 days for a cassette tape to: Eglise du Christ, C.P. 2026, Jonquiere, QC, G7X 7XC Canada. Email: egliseduchrist@videotron.ca (Kusalik, CAN)



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes	
s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly
occ:	occasional
DRM:	Digital Radio Mondiale

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "v" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions.

But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas	
af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
oc:	Oceania
pa:	Pacific
sa:	South America
va:	various

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager

gaylevanhorn@monitoringtimes.com

Daniel Sampson
danielsampson@monitoringtimes.com

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; *BCL News*; *Cumbre DX*; Adrian Sainsbury, *RNZ Intl*; Daniel Sampson/*Prime Time-SW*; Anker Petersen, *DX Window*; *Observer*, Bulgaria; *BCL News*; *ODXA/DX Ontario*; Larry Van Horn *N5FPW*, *MT Asst. Editor*; *Hard Core DX*; *NASWA Journal*; *WWDX*.

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007. They are only authorized on a non-interference basis until that date.
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide

**GLENN HAUSER'S
WORLD OF RADIO**
<http://www.worldofradio.com>

For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!

Editor's note: Although most of the US shifts to Daylight Savings Time this month, its observance is certainly not universal. Some stations will keep their programming at the same time UTC and some will shift in accord with their local time.

0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

0000	0015	vi	Cambodia, National Radio	11940as	
0000	0015		Japan, Radio Japan/NHK World	6145na	
			13650as 17810as		
0000	0030		Australia, HCJB	15530as	
0000	0030		Burma, Dem Voice of Burma	5955eu	
0000	0030		Egypt, Radio Cairo	11885na	
0000	0030		Thailand, Radio	9680af	
0000	0030		UK, BBC World Service	3915as 5970as	
			6195as 9410as	9740as 11945as	
0000	0030		USA, Voice of America	6235as 7405as	
			11760va 15185va	15290va 17740va	
0000	0045		India, All India Radio	9705as 9950as	
			11620as 11645as	13605as	
0000	0057		Canada, Radio Canada Intl	9755am 9800as	
0000	0059		Spain, Radio Exterior Espana	6055na	
0000	0100		Anguilla, Caribbean Beacon	6090am	
0000	0100		Australia, ABC NT Alice Springs	2310irr	
			4835do		
0000	0100		Australia, ABC NT Katherine	5025do	
0000	0100		Australia, ABC NT Tennant Creek	4910do	
0000	0100		Australia, Radio	9660pa 12080pa	13630pa
			13670va 15240pa	17715va 17750as	
			17775as 17795pa		
0000	0100		Bulgaria, Radio	7400na 9700na	
0000	0100		Canada, CFRX Toronto ON	6070do	
0000	0100		Canada, CFVP Calgary AB	6030do	
0000	0100		Canada, CKZN St John's NF	6160do	
0000	0100		Canada, CKZU Vancouver BC	6160do	
0000	0100		China, China Radio Intl	6020na 6075as	
			7130as 7180as	7345na 9570na	
0000	0100		Costa Rica, University Network	5030va 6150va	
			7375va 9725va		
0000	0100		Germany, Deutsche Welle	6030as 7290as	
0000	0100		Guyana, Voice of	3290do	
0000	0100		Malaysia, RTM/Trax FM	7295as	
0000	0100	vi	Namibia, Namibian BC Corp	3270do 3290do	
			6060do 6175do		
0000	0100		Netherlands, Radio6165na		
0000	0100		New Zealand, Radio NZ Intl	17675pa	
0000	0100	drm test	New Zealand, Radio NZ Intl	15720pa	
0000	0100	vi	Papua New Guinea, Wantok R.Light	7120va	
0000	0100		Singapore, Mediacorp Radio	6150do	
0000	0100		UK, BBC World Service	5975ca	
0000	0100	drm	UK, BBC World Service	6010na	
			USA, AFRTS	4156usb 5446usb	
			5765usb 7590usb	7812usb 12133usb	
			12579usb 12133usb	12579usb 13362usb	
			13855usb		
0000	0100		USA, KAIJ Dallas TX	5755na	
0000	0100		USA, KTBN Salt Lake City UT	7505na	
0000	0100		USA, KWHR Naalehu HI	17655as	
0000	0100		USA, WBCQ Kennebunk ME	5110na 7415na	
			9330na		
0000	0100		USA, WBOH Newport NC	5920am	
0000	0100		USA, WEWN Birmingham AL	6875va 7540va	
			11870va 13615va		
0000	0100		USA, WHRA Greenbush ME	5850na 5875na	
			6195na		
0000	0100		USA, WHRI Noblesville IN	7315am 7490am	
			15665am		
0000	0100		USA, WINB Red Lion PA	9265am	
0000	0100	twhfa	USA, WRMI Miami FL	7385am 9955am	
0000	0100		USA, WTJC Newport NC	9370na	
0000	0100		USA, WWCR Nashville TN	3215na 5070na	
			7465na 13845na		
0000	0100		USA, WWRB Manchester TN	3270na 5050na	
			5745na		
0000	0100		USA, WYFR Okeechobee FL	6065am 9505am	
			17805va		
0000	0100		Zambia, Christian Voice	4965af	
0013	0030	twhf	Austria, Radio Austria Intl	7325ca	
0015	0030	sm	Austria, Radio Austria Intl	7325ca	
0015	0030	a	Austria, Radio Austria Intl	7325ca	
0030	0045	s	Germany, Pan American BC	5945as	
0030	0100		Australia, Radio	15415as	
0030	0100	fas	Germany, Bible Voice Broadcasting	6010as	
0030	0100		Lithuania, Radio Vilnius	9875na	
0030	0100		Thailand, Radio	5890na	
0030	0100		UK, BBC World Service	11955as 15280as	
			15310as 17655as	17790as	
0030	0100		UK, BBC World Service	5970as 6195as	
			9410as 9740as	11955as 15280as	
			15310as 15360as	17790as	
0030	0100		USA, Voice of America	7130va 9620va	
			11805va 15185va	15205va	
0033	0100	sm	Austria, Radio Austria Intl	7325va	
0040	0058	twhf	Austria, Radio Austria Intl	7325na	
0040	0100		Vatican City, Vatican Radio	7335as 9865as	

0043	0058	a	Austria, Radio Austria Intl	17855va
0045	0100		Pakistan, Radio	7445as 9340as
0055	0100		Italy, RAI Intl	11800na

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0100	0115	m	Australia, HCJB	15405as	
0100	0115		Italy, RAI Intl	11800na	
0100	0115		Pakistan, Radio	7445as	9340as
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na
0100	0129	s	Germany, Universal Life	7145as	
0100	0130		Australia, Radio	17775as	
0100	0130		Slovakia, Radio Slovakia Intl	7230na 9440sa	
0100	0130		Uzbekistan, Radio Tashkent	7160as 7190as	
0100	0130		Vietnam, Voice of	6175na	
0100	0156		Romania, Radio Romania Intl	6150na 9615na	
0100	0159		Canada, Radio Canada Intl	9755am	
0100	0200		Anguilla, Caribbean Beacon	6090am	
0100	0200		Australia, ABC NT Katherine	5025do	
0100	0200		Australia, ABC NT Tennant Creek	4910do	
0100	0200		Australia, Radio	9660pa 12080pa	13630pa
			13670va 15415as	15240pa 17715as	
			17750as 17795pa		
0100	0200		Canada, CFRX Toronto ON	6070do	
0100	0200		Canada, CFVP Calgary AB	6030do	
0100	0200		Canada, CKZN St John's NF	6160do	
0100	0200		Canada, CKZU Vancouver BC	6160do	
0100	0200		China, China Radio Intl	6005na 6020na	
			6075as 7180as	9570na 9580na	
0100	0200		Costa Rica, University Network	5030va 6150va	
			7375va 9725va		
0100	0200		Cuba, Radio Havana	6000na 6060na	
			9820na		
0100	0200		Guyana, Voice of	3291do	
0100	0200		Indonesia, Voice of	9525as	11785pa 15150al
0100	0200		Japan, Radio Japan/NHK World	6030va	
			11860as 11935sa	153235as 17560va	
			17685oc 17810as	17825am 17845as	
0100	0200		Malaysia, RTM/Trax FM	7295as	
0100	0200	vi	Namibia, Namibian BC Corp	3270do 3290do	
			6060do 6175do		
0100	0200		Netherlands, Radio6165na		
0100	0200		New Zealand, Radio NZ Intl	17675pa	
0100	0200	drm test	New Zealand, Radio NZ Intl	15720pa	
0100	0200		North Korea, Voice of	7140as 9345as	
			9730am 11735ca	13760ca 15180ca	
0100	0200	vi	Papua New Guinea, Wantok R.Light	7120va	
0100	0200		Singapore, Mediacorp Radio	6150do	
0100	0200		UK, BBC World Service	6195as 9410as	
			11955as 15280as	15310as 15360as	
			17790as		
0100	0200		Ukraine, Radio Ukraine Intl	5880na	
0100	0200		USA, AFRTS	4156usb 5765usb	4319usb 5765usb
			5765usb 7590usb	7812usb 12133usb	
			12579usb 12133usb	12579usb 13362usb	
			13855usb		
0100	0200		USA, KAIJ Dallas TX	5755na	
0100	0200		USA, KTBN Salt Lake City UT	7505na	
0100	0200		USA, KWHR Naalehu HI	17655as	
0100	0200		USA, Voice of America	7200va 11705va	
			11820va		
0100	0200		USA, WBCQ Kennebunk ME	5110na 7415na	
			9330na		
0100	0200		USA, WBOH Newport NC	5920am	
0100	0200		USA, WEWN Birmingham AL	6875va 7540va	
			11870va 13615va		
0100	0200		USA, WHRA Greenbush ME	5850na 5875na	
0100	0200	twhfa	USA, WHRI Noblesville IN	5835am 5860am	
0100	0200	sm	USA, WHRI Noblesville IN	7315am 7490am	
0100	0200		USA, WINB Red Lion PA	9265am	
0100	0200	twhfa	USA, WRMI Miami FL	7385am 9955am	
0100	0200		USA, WTJC Newport NC	9370na	
0100	0200		USA, WWCR Nashville TN	3215na 5070na	
			5935na 7465na		
0100	0200		USA, WWRB Manchester TN	3270na 5050na	
			5745na		
0100	0200		USA, WYFR Okeechobee FL	6065am 9505am	
			15060as		
0100	0200		Zambia, Christian Voice	4965af	
0115	0130	twhf	Armenia, FEBA	5885eu	
0130	0200		Australia, HCJB	15405as	
0130	0200		Iran, Voice of the Islamic Rep	6120am 9665am	
0130	0200		Sweden, Radio	11550va	
0130	0200	twhfa	USA, Voice of America	7315va 7405va	

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0220		Vatican City, Vatican Radio	7335as 9865as
0200	0227		Czech Rep, Radio Prague Intl	6200na 7345na
0200	0227		Iran, Voice of the Islamic Rep	6120am 9665am
0200	0228		Hungary, Radio Budapest	9515na
0200	0230	s	Australia, HCJB	15405as
0200	0300		Anguilla, Caribbean Beacon	6090am
0200	0300	twhfa	Argentina, RAE	11710am

0200	0300	Australia, ABC NT Alice Springs	2310irr	
		4835do		
0200	0300	Australia, ABC NT Katherine	5025do	
0200	0300	Australia, ABC NT Tennant Creek	4910do	
0200	0300	Australia, Radio	9660pa 12080pa 13630pa	
		13670va 15415as 15240pa 15515pa		
		17750as 21725va		
0200	0300	Canada, CFRX Toronto ON	6070do	
0200	0300	Canada, CFVP Calgary AB	6030do	
0200	0300	Canada, CKZN St John's NF	6160do	
0200	0300	Canada, CKZU Vancouver BC	6160do	
0200	0300	China, China Radio Intl	11770as 13640as	
0200	0300	Costa Rica, University Network	5030va 6150va	
		7375va 9725va		
0200	0300	Cuba, Radio Havana	6000na 6060na	
		9820na		
0200	0300	Egypt, Radio Cairo	7270na	
0200	0300	Guyana, Voice of	3291do	
0200	0300	Malaysia, RTM/Trax FM	7295as	
0200	0300	Namibia, Namibian BC Corp	3270do 3290do	
		6060do 6175do		
0200	0300	New Zealand, Radio NZ Intl	17675pa	
0200	0300	New Zealand, Radio NZ Intl	15720pa	
0200	0300	North Korea, Voice of	13650as 15100as	
0200	0300	Papua New Guinea, Wantok R.Light	7120va	
0200	0300	Philippines, Radio Pilipinas	11885va 15270va	
		17665va		
0200	0300	Russia, Voice of	7180na 7250na 7350na	
		15425na 15475na 15595na		
0200	0300	Singapore, Mediacorp Radio	6150do	
0200	0300	South Korea, KBS World Radio	9560na	
		11810sa 15575na		
0200	0300	Taiwan, Radio Taiwan Intl	5950na 9680na	
		11875as 15465as		
0200	0300	UK, BBC World Service	5975ca 6195me	
		9750af 9825ca 11955as 12095ca		
		15280as 15310as 15360as 17790as		
0200	0300	USA, AFRTS	4156usb 4319usb 5765usb	
		5765usb 7590usb 7812usb 12133usb		
		12579usb 12133usb 13362usb		
		13855usb		
0200	0300	USA, KAIJ Dallas TX	5755na	
0200	0300	USA, KJES Vado NM	7555na	
0200	0300	USA, KTNB Salt Lake City UT	7505na	
0200	0300	USA, KWHR Naalehu HI	17655as	
0200	0300	USA, WBCQ Kennebunk ME	5110na 7415na	
		9330na		
0200	0300	USA, WBOH Newport NC	5920am	
0200	0300	USA, WEWN Birmingham AL	6875va 7540va	
		11870va 13615va		
0200	0300	USA, WHRA Greenbush ME	5850na 5875na	
0200	0300	USA, WHRI Noblesville IN	5835am 5860am	
0200	0300	USA, WHRI Noblesville IN	7315am 7490am	
0200	0300	USA, WINB Red Lion PA	9265am	
0200	0300	USA, WRMI Miami FL	7385am 9955am	
0200	0300	USA, WTJC Newport NC	9370na	
0200	0300	USA, WWCR Nashville TN	3215na 5070na	
		5765na 5935na		
0200	0300	USA, WWRB Manchester TN	3270na 5050na	
		5745na		
0200	0300	USA, WYFR Okeechobee FL	5985va 6065am	
		9505am 11855va		
0200	0300	Zambia, Christian Voice	4965af	
0215	0230	Nepal, Radio	3230as 5005as 6100as	
		7165as		
0230	0300	Sweden, Radio	6010na	
0230	0300	Vietnam, Voice of	6175na	
0245	0300	Albania, Radio Tirana	6115eu 7455eu	
0245	0300	Myanmar, Radio	9730do	
0250	0300	Vatican City, Vatican Radio	7305am 9605am	

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0315	vl	Croatia, Croatian Radio	7285va	
0300	0320		Vatican City, Vatican Radio	7305am	9605am
0300	0330	mtwhfa	Belarus, Radio	5970eu	6155eu 7210eu
0300	0330	s	Belarus, Radio	5970eu	6155eu 7210eu
0300	0330		Egypt, Radio Cairo	7270na	
0300	0330		Myanmar, Radio	9730do	
0300	0330		Philippines, Radio Pilipinas	11885va 15270va	
			17665va		
0300	0330		Thailand, Radio	5890na	
0300	0330		UK, BBC World Service	3255af 5975ca	
			6005af 6190af 6195me 7160as		
			11760me 11765af 12035af 15280as		
			15310as 17790as 21660as		
0300	0330		USA, KJES Vado NM	7555na	
0300	0330		Vatican City, Vatican Radio	7360af	
0300	0330	vl	Vietnam, Voice of	6175na	
0300	0358	drm test	New Zealand, Radio NZ Intl	15720pa	
0300	0359		New Zealand, Radio NZ Intl	17675pa	
0300	0400		Anguilla, Caribbean Beacon	6090am	
0300	0400		Australia, ABC NT Alice Springs	2310irr	
			4835do		
0300	0400		Australia, ABC NT Katherine	5025do	

0300	0400		Australia, ABC NT Tennant Creek	4910do	
0300	0400		Australia, CVC International	13685as	
0300	0400		Australia, Radio	9660pa 12080pa 13630pa	
			13670va 15415as 15240pa 15515pa		
			17750as 21725va		
0300	0400		Bulgaria, Radio	7400na 9700na	
0300	0400	twhf	Canada, CBC NQ SW Service	9625na	
0300	0400		Canada, CFRX Toronto ON	6070do	
0300	0400		Canada, CFVP Calgary AB	6030do	
0300	0400		Canada, CKZN St John's NF	6160do	
0300	0400		Canada, CKZU Vancouver BC	6160do	
0300	0400		China, China Radio Intl	9690na 9790na	
			11770as 15110as 15120as		
0300	0400		Costa Rica, University Network	5030va 6150va	
			7375va 9725va		
0300	0400		Cuba, Radio Havana	6000na 6060na	
			9820na		
0300	0400		Guyana, Voice of	3291do	
0300	0400		Japan, Radio Japan/NHK World	21610oc	
0300	0400		Malaysia, RTM/Trax FM	7295as	
0300	0400		Malaysia, Voice of	6175as 9750as 15295as	
0300	0400	vl	Namibia, Namibian BC Corp	3270do 3290do	
			6060do 6175do		
0300	0400		North Korea, Voice of	7140as 9345as	
			9730as		
0300	0400	vl	Oman, Radio Oman	15355as	
0300	0400	vl	Papua New Guinea, Wantok R.Light	7120va	
0300	0400		Russia, Voice of	7180na 7350na 15425na	
			15475na 15595na		
0300	0400	vl	Rwanda, Radio	6055do	
0300	0400		Singapore, Mediacorp Radio	6150do	
0300	0400		South Africa, Channel Africa	3345af 7390af	
0300	0400		Taiwan, Radio Taiwan Intl	5950na 15215sa	
			15320as		
0300	0400	vl/ mtwhf	UK, Sudan Radio Service	7120va	
0300	0400		USA, AFRTS	4156usb 4319usb 5765usb	
			5765usb 7590usb 7812usb 12133usb		
			12579usb 12133usb 12579usb 13362usb		
			13855usb		
0300	0400		USA, KAIJ Dallas TX	5755na	
0300	0400		USA, KTNB Salt Lake City UT	7505na	
0300	0400		USA, KWHR Naalehu HI	17655as	
0300	0400		USA, Voice of America	4930af 6035af	
			6080af 7290af 7340af 9885af		
0300	0400		USA, WBCQ Kennebunk ME	5110na 7415na	
			9330na		
0300	0400		USA, WBOH Newport NC	5920am	
0300	0400		USA, WEWN Birmingham AL	6875va 7540va	
			11870va 13615va		
0300	0400		USA, WHRA Greenbush ME	5850na 5875na	
0300	0400	twhfa	USA, WHRI Noblesville IN	5835am 5860am	
0300	0400	sm	USA, WHRI Noblesville IN	7315am 7490am	
0300	0400		USA, WINB Red Lion PA	9265am	
0300	0400	twhfa	USA, WRMI Miami FL	7385am 9955am	
0300	0400		USA, WTJC Newport NC	9370na	
0300	0400		USA, WWCR Nashville TN	3215na 5070na	
			5765na 5935na		
0300	0400		USA, WWRB Manchester TN	3270na 5050na	
			5745na		
0300	0400		USA, WYFR Okeechobee FL	6065am 9505am	
			11740va 15255va		
0300	0400		Zambia, Christian Voice	4965af	
0300	0400	vl	Zimbabwe, ZBC Corp	5975do	
0330	0358		Hungary, Radio Budapest	9775eu	
0330	0400	stwhfa	Albania, Radio Tirana	6115eu 7455eu	
0330	0400		Sweden, Radio	6010na	
0330	0400		UK, BBC World Service	3255af 6005af	
			6190af 7160af 11765af 12035af		
			15420af		
0330	0400		USA, Voice of America	4930af 6035af	
			6045af 6080af 7290af 9885af		

0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

0400	0427		Czech Rep, Radio Prague Intl	6100na 7345na	
0400	0430		France, Radio France Intl	7315va 9555va	
			9805va 11995va		
0400	0430		USA, Voice of America	4930af 4960af	
			6080af 7290af 9575af 9775af		
			9885af		
0400	0430	vl	Vietnam, Voice of	6175na	
0400	0456		Romania, Radio Romania Intl	6115na 9515na	
			9690as 11895as		
0400	0500		Anguilla, Caribbean Beacon	6090am	
0400	0500		Australia, ABC NT Alice Springs	2310irr	
			4835do		
0400	0500		Australia, ABC NT Katherine	5025do	
0400	0500		Australia, ABC NT Tennant Creek	4910do	
0400	0500		Australia, CVC International	13685as	
0400	0500		Australia, Radio	9660pa 12080pa 13670va	
			15240pa 15515pa 17750as 21725va		
0400	0500	twhf	Canada, CBC NQ SW Service	9625na	
0400	0500		Canada, CFRX Toronto ON	6070do	
0400	0500		Canada, CKZN St John's NF	6160do	
0400	0500		Canada, CKZU Vancouver BC	6160do	
0400	0500		China, China Radio Intl	6190na 9755na	

0400	0500		Costa Rica, University Network	5030va	6150va
			7375va	9725va	
0400	0500		Cuba, Radio Havana	6000na	6060na
			9820na		
0400	0500		Germany, Deutsche Welle	6180af	9710af
			15445af		
0400	0500		Guyana, Voice of	3291do	
0400	0500		Malaysia, RTM/Trax FM	7295as	
0400	0500		Malaysia, Voice of	6175as	15295as
0400	0500	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0400	0500		New Zealand, Radio NZ Intl	15720pa	
0400	0500	drm test	New Zealand, Radio NZ Intl	13690pa	
0400	0500		Nigeria, Radio/Kaduna	6090do	
0400	0500	vl	Papua New Guinea, Wantok R.Light	7120va	
0400	0500		Russia, Voice of	7150na	7350na
			9840na	12010na	15475na
0400	0500	drm	Russia, Voice of	15595na	
0400	0500	vl	Rwanda, Radio	6055do	
0400	0500		Singapore, Mediacorp Radio	6150do	
0400	0500		South Africa, Channel Africa	7390af	
0400	0500		Turkey, Voice of	6020va	7240va
0400	0500	vl	Uganda, Radio	4976do	7196do
0400	0500		UK, BBC World Service	3255af	6005af
			6195eu	7130eu	11760me
			11765af	12035af	15310as
			15575me	15420af	17760as
			21660as		
0400	0500	drm	UK, BBC World Service	6010na	
0400	0500	vl/ mtwhf	UK, Sudan Radio Service	7120va	
0400	0500		Ukraine, Radio Ukraine Intl	5880na	
0400	0500		USA, AFRTS	4156usb	5765usb
			5765usb	7590usb	7812usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
0400	0500		USA, KAIJ Dallas TX	5755na	
0400	0500		USA, KTNB Salt Lake City UT	7505na	
0400	0500		USA, KWHR Naalehu HI	17655as	
0400	0500		USA, WBCQ Kennebunk ME	5110na	7415na
			9330na		
0400	0500		USA, WBOH Newport NC	5920am	
0400	0500		USA, WEWN Birmingham AL	6875va	7540va
			11870va	13615va	
0400	0500		USA, WHRA Greenbush ME	5850na	5875na
0400	0500	twhfa	USA, WHRI Noblesville IN	6100am	7315am
0400	0500	sm	USA, WHRI Noblesville IN	7315am	7490am
0400	0500		USA, WMLK Bethel PA	9265eu	9955eu
0400	0500	twhfa	USA, WRMI Miami FL	7385am	9955am
0400	0500		USA, WTJC Newport NC	9370na	
0400	0500		USA, WWCR Nashville TN	3215na	5070na
			5765na	5935na	
0400	0500		USA, WWRB Manchester TN	3270na	5050na
			5745na		
0400	0500		USA, WYFR Okeechobee FL	6065am	6855am
			7780va	9505am	9715am
0400	0500		Zambia, Christian Voice	6065af	
0400	0500	vl	Zimbabwe, ZBC Corp	5975do	
0430	0445		Israel, Kol Israel	6280va	15640va
0430	0500		Australia, Radio	15415as	
0430	0500		Czech Rep, Radio Prague Intl	9885va	11600va
0430	0500		Nigeria, Radio/Ibadan	6050do	
0430	0500		Nigeria, Radio/Kaduna	4770do	
0430	0500		Nigeria, Radio/Lagos	3326do	4990do
0430	0500		Swaziland, TWR	4775af	
0430	0500		USA, Voice of America	4930af	4960af
			6080af	9575af	9775af
0445	0500		Italy, RAI Intl	5965af	6120af
					7170af

0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0507	twhf	Canada, CBC NQ SW Service	9625na	
0500	0530		France, Radio France Intl	11850va	11995va
			15155va		
0500	0530	vl	Rwanda, Radio	6055do	
0500	0530		UK, BBC World Service	6005af	6190af
			7160af	11955as	15280as
			15310as	15420af	17760as
			17790as	21660as	
0500	0530		Vatican City, Vatican Radio	7360af	9660af
			11625af		
0500	0600		Anguilla, Caribbean Beacon	6090am	
0500	0600		Australia, ABC NT Alice Springs	4835do	2310irr
0500	0600		Australia, ABC NT Katherine	5025do	
0500	0600		Australia, ABC NT Tennant Creek	4910do	
0500	0600		Australia, CVC International	13685as	
0500	0600		Australia, Radio	9660pa	13630pa
			13670pa	15160va	15240pa
			17750as		15515pa
0500	0600		Bhutan, BBS	6035as	
0500	0600		Canada, CFRX Toronto ON	6070do	
0500	0600		Canada, CKZN St John's NF	6160do	
0500	0600		Canada, CKZU Vancouver BC	6160do	
0500	0600		China, China Radio Intl	5960na	6190na
			7220af	9590af	11750as
					15350as

0500	0600		15465as	17505va	17540as	6150va
			Costa Rica, University Network	5030va		
			7375va	9725va		
0500	0600		Cuba, Radio Havana	6000va	6060va	
			9550va	9820va	11760va	
0500	0600		Germany, Deutsche Welle	7285af	9565af	
			12035af	15410af		
0500	0600		Guyana, Voice of	3291do		
0500	0600		Japan, Radio Japan/NHK World	6110na	7230eu	15195as
			21755oc			17810as
0500	0600		Malaysia, RTM/Trax FM	7295as		
0500	0600		Malaysia, Voice of	6175as		15295as
0500	0600	vl	Namibia, Namibian BC Corp	3270do		3290do
			6060do	6175do		
0500	0600		Netherlands, Radio6165na	11710oc		
0500	0600		New Zealand, Radio NZ Intl	15720pa		
0500	0600	drm test	New Zealand, Radio NZ Intl	13690pa		
0500	0600		Nigeria, Radio/Ibadan	6050do		
0500	0600		Nigeria, Radio/Kaduna	4770do		6090do
0500	0600		Nigeria, Radio/Lagos	3326do		4990do
0500	0600		Nigeria, Voice of	7255af		
0500	0600	vl	Papua New Guinea, Wantok R.Light	7120va		
0500	0600		Russia, Voice of	7150na	7180na	12010na
			15425na			
0500	0600		Singapore, Mediacorp Radio	6150do		
0500	0600		South Africa, Channel Africa	7240af	11875af	
0500	0600		Swaziland, TWR	3200af	4775af	9500af
0500	0600	vl	Uganda, Radio	4976do	5026do	7196do
0500	0600		UK, BBC World Service	6195va	9410va	
			11760me	12095eu	15575me	
0500	0600		UK, CVC International	9430af		
0500	0600	vl/ mtwhf	UK, Sudan Radio Service	9525va		
0500	0600		USA, AFRTS	4156usb	5765usb	
			5765usb	7590usb	7812usb	12133usb
			12579usb	12133usb	12579usb	13362usb
			13855usb			
0500	0600		USA, KAIJ Dallas TX	5755na		
0500	0600		USA, KTNB Salt Lake City UT	7505na		
0500	0600		USA, KWHR Naalehu HI	11565as	15610as	
0500	0600		USA, Voice of America	6035af	6080af	
			6105af	7295af	13710af	
0500	0600		USA, WBCQ Kennebunk ME	5110na	7415na	
			9330na			
0500	0600		USA, WBOH Newport NC	5920am		
0500	0600		USA, WEWN Birmingham AL	5850va	7540va	
			7570va	11870va		
0500	0600		USA, WHRA Greenbush ME	5875na	7555na	
0500	0600	twhfa	USA, WHRI Noblesville IN	6100am	7315am	
0500	0600	sm	USA, WHRI Noblesville IN	7315am	7490am	
0500	0600		USA, WMLK Bethel PA	9265eu	9955eu	
0500	0600	twhfa	USA, WRMI Miami FL	7385am		
0500	0600		USA, WTJC Newport NC	9370na		
0500	0600		USA, WWCR Nashville TN	3215na	5070na	
			5765na	5935na		
0500	0600		USA, WWRB Manchester TN	3185na		
0500	0600		USA, WYFR Okeechobee FL	6855am	9355va	
0500	0600		Zambia, Christian Voice	6065af		
0500	0600	vl	Zimbabwe, ZBC Corp	5975do		
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do	
0530	0600		Australia, Radio	15415as		
0530	0600		Thailand, Radio	13770eu		
0530	0600	mtwhf	UK, BBC World Service	17885af		
0530	0600		UK, BBC World Service	11955as	15310as	
			15360as	17760as	17790as	21660as
0545	0600	vl	Rwanda, Radio	6055do		

0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0615	as	South Africa, TWR	11640af	
0600	0630		UK, BBC World Service	6005af	6190af
			6195af	7160af	9410af
			11940af	17640af	
0600	0630		USA, Voice of America	6035af	6080af
			6105af	7295af	11835af
			13710af		11995af
0600	0630		Vatican City, Vatican Radio	4005af	5885eu
			7250eu		
0600	0645	mtwhf	South Africa, TWR	11640af	
0600	0658		France, Radio France Intl	9865af	15155af
			17800af		
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs	4835do	2310irr
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek	4910do	
0600	0700		Australia, CVC International	15355as	
0600	0700		Australia, Radio	9660pa	12080pa
			13630pa	13670va	15160pa
			15415as	15515pa	17750as
0600	0700		Canada, CFRX Toronto ON	6070do	
0600	0700		Canada, CFVP Calgary AB	6030do	
0600	0700		Canada, CKZN St John's NF	6160do	
0600	0700		Canada, CKZU Vancouver BC	6160do	
0600	0700		China, China Radio Intl	6115na	9590af
			11750af	11880as	15140as
					15465as

0600	0700		17540as	17540va		
			Costa Rica, University Network	5030va	6150va	
			7375va	9725va	11870va	
0600	0700		Cuba, Radio Havana	6000va	6060va	
			9550va	9820va	11760va	
0600	0700		Germany, Deutsche Welle	6140eu	7225af	
			11785af	15440af		
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do	
0600	0700		Guyana, Voice of	3291do		
0600	0700		Italy, IRRS	5775va		
0600	0700		Japan, Radio Japan/NHK World		7230eu	
			11690am	11715as	11740as	11760as
			15195as	17870oc		
0600	0700		Liberia, ELWA	4760do		
0600	0700		Malaysia, RTM/Trax FM	7295as		
0600	0700		Malaysia, Voice of	6175as	9750as	15295as
0600	0700	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do	6175do		
0600	0700		New Zealand, Radio NZ Intl	15720pa		
0600	0700	drm test	New Zealand, Radio NZ Intl	13690pa		
0600	0700		Nigeria, Radio/Ibadan	6050do		
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	
0600	0700		Nigeria, Radio/Lagos	3326do	4990do	
0600	0700		Nigeria, Voice of	15120af		
0600	0700	vl	Papua New Guinea, Wantok R.Light		7120va	
0600	0700		Russia, Voice of	17665oc	17805oc	
0600	0700	irreg/ vl	Sierra Leone, SLBS 3316do			
0600	0700		Singapore, MediCorp Radio	6150do		
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do	
0600	0700		South Africa, Channel Africa	7240af	15255af	
0600	0700		Swaziland, TWR	4775af	9500af	
0600	0700	as	UK, BBC World Service	17885af		
0600	0700		UK, BBC World Service	6195eu	9410eu	
			11955as	12095eu	15310as	15360as
			15565eu	15575me	17760me	17790as
0600	0700		UK, CVC International	9430af		
0600	0700		USA, AFRTS	4156usb	4319usb	5765usb
			5765usb	7590usb	7812usb	12133usb
			12579usb	12133usb	12579usb	13362usb
			13855usb			
0600	0700		USA, KAIJ Dallas TX	5755na		
0600	0700		USA, KBTN Salt Lake City UT	7505na		
0600	0700		USA, KWHR Naalehu HI	11565as	15610as	
0600	0700		USA, WBCQ Kennebunk ME	5110na	7415na	
0600	0700		USA, WBOH Newport NC	5920am		
0600	0700		USA, WEWN Birmingham AL	5850va	7540va	
			11870va			
0600	0700		USA, WHRA Greenbush ME	6135na	7555na	
0600	0700	thas	USA, WHRI Noblesville IN	5860am	5875am	
			6125am			
0600	0700	smtw	USA, WHRI Noblesville IN	7315sa		
0600	0700		USA, WMLK Bethel PA	9265eu	9955eu	
0600	0700	twhfa	USA, WRMI Miami FL	7385am		
0600	0700		USA, WTJC Newport NC	9370na		
0600	0700		USA, WWCR Nashville TN	3215na	5070na	
			5765na	5935na		
0600	0700		USA, WWRB Manchester TN	3185na		
0600	0700		USA, WYFR Okeechobee FL	5810va	7780va	
			11530af	11580va		
0600	0700	vl	Vanuatu, Radio	4960do		
0600	0700		Yemen, Rep of Yemen Radio	9780me		
0600	0700		Zambia, Christian Voice	6065af		
0600	0700	vl	Zimbabwe, ZBC Corp	5975do		
0605	0630	s	Austria, Radio Austria Intl	17870me		
0630	0656		Romania, Radio Romania Intl	7180eu	9690eu	
			15135pa	17780pa		
0630	0700		UK, BBC World Service	6005af	6190af	
			6195va	7160af	9410af	11765af
			11940af	15400af		
0630	0700	as	UK, BBC World Service	17885af		
0630	0700		USA, Voice of America	6080af	7295af	
			11835af			
0630	0700		Vatican City, Vatican Radio	9660af	11625af	
			13765af			
0630	0700		Vatican City, Vatican Radio	9660af	11625af	
			13765af			

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0710		Vatican City, Vatican Radio	4005eu	5885eu	
			6185eu	7250eu	9645eu	11740eu
			15595eu			
0700	0715		UK, BBC World Service	6005af	6190af	
			9410af	11940af	12095af	
			15400af	15485af	17640af	17830af
0700	0715	as	UK, BBC World Service	17885af		
0700	0730		Slovakia, Radio Slovakia Intl	13715pa	15460pa	
0700	0730		UK, BBC World Service	11760me	15575me	
0700	0745		USA, WYFR Okeechobee FL	7780va		
0700	0759		New Zealand, Radio NZ Intl	15720pa		
0700	0759	drm test	New Zealand, Radio NZ Intl	13690pa		
0700	0800		Anguilla, Caribbean Beacon	6090am		
0700	0800		Australia, ABC NT Alice Springs		2310irr	
			4835do			
0700	0800		Australia, ABC NT Katherine	5025do		

0700	0800		Australia, ABC NT Tennant Creek		4910do	
0700	0800		Australia, CVC International	15355as		
0700	0800		Australia, HCJB	11750pa		
0700	0800		Australia, Radio	9660pa	9710pa	11880pa
			12080pa	13630pa	15160pa	15240pa
			15415as	17750as		
0700	0800		Canada, CFRX Toronto ON	6070do		
0700	0800		Canada, CFVP Calgary AB	6030do		
0700	0800		Canada, CKZN St John's NF	6160do		
0700	0800		Canada, CKZU Vancouver BC	6160do		
0700	0800		China, China Radio Intl	11785eu	11880as	
			15350as	15465as	17490eu	17540as
0700	0800		Costa Rica, University Network	5030va	6150va	
			7375va	9725va	11870va	
0700	0800		Eqt Guinea, Radio Africa	15190af		
0700	0800		France, Radio France Intl	11725af	11725af	
0700	0800		Germany, Deutsche Welle	6140eu		
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do	
0700	0800		Guyana, Voice of	3291do	5950do	
0700	0800	mtwhf	Italy, IRRS	13840va		
0700	0800		Liberia, ELWA	4760do		
0700	0800		Liberia, Star Radio	9525af		
0700	0800		Malaysia, RTM/Trax FM	7295as		
0700	0800		Malaysia, Voice of	6175as	9750as	15295as
0700	0800		Myanmar, Radio	9730do		
0700	0800	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do	6175do		
0700	0800		Nigeria, Radio/Ibadan	6050do		
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do	
0700	0800		Nigeria, Radio/Lagos	3326do	4990do	
0700	0800	vl	Papua New Guinea, Wantok R.Light		7120va	
0700	0800		Russia, Voice of	17665oc	17805oc	
0700	0800	irreg/ vl	Sierra Leone, SLBS 3316do			
0700	0800		Singapore, MediCorp Radio	6150do		
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do	
0700	0800	vl	South Africa, Channel Africa	11825af		
0700	0800		Swaziland, TWR	4775af	6120af	9500af
0700	0800		Taiwan, Radio Taiwan Intl	5950na		
0700	0800		UK, BBC World Service	9410eu	11955as	
			12095eu	15310as	15360as	15565eu
			17760as	17790as	21660me	
0700	0800		UK, CVC International	15640af		
0700	0800		USA, AFRTS	4156usb	4319usb	5765usb
			5765usb	7590usb	7812usb	12133usb
			12579usb	12133usb	12579usb	13362usb
			13855usb			
0700	0800		USA, KAIJ Dallas TX	5755na		
0700	0800		USA, KBTN Salt Lake City UT	7505na		
0700	0800		USA, KWHR Naalehu HI	11565as	15610as	
0700	0800		USA, WBCQ Kennebunk ME	5110na	7415na	
0700	0800		USA, WBOH Newport NC	5920am		
0700	0800		USA, WEWN Birmingham AL	5850va	7540va	
			11870va			
0700	0800		USA, WHRA Greenbush ME	6135na	7465na	
0700	0800		USA, WHRI Noblesville IN	5860am	5875am	
			7315sa			
0700	0800		USA, WMLK Bethel PA	9265eu	9955eu	
0700	0800	twhfa	USA, WRMI Miami FL	7385am		
0700	0800		USA, WTJC Newport NC	9370na		
0700	0800		USA, WWCR Nashville TN	3215na	5070na	
			5765na	5935na		
0700	0800		USA, WWRB Manchester TN	3185na		
0700	0800		USA, WYFR Okeechobee FL	5985am	6855am	
			7355va	9505va	9715am	9930af
0700	0800	vl	Vanuatu, Radio	4960do		
0700	0800		Zambia, Christian Voice	6065af		
0715	0800		UK, BBC World Service	6190af	9410af	
			11765af	11940af	12095af	15400af
			15485af	17640af		
0715	0800	as	UK, BBC World Service	17885af		
0730	0745		Vatican City, Vatican Radio	4005va	5885va	
			6185va	7250va	9645va	11740va
			15595va			
0730	0800		Bulgaria, Radio	9500eu	11500eu	
0730	0800	as	Germany, Bible Voice Broadcasting		5945eu	
0730	0800	as	Guam, TWR/KTWR	15255as		
0730	0800		UK, BBC World Service		11760me	15575me
0740	0800	mtwhf	Guam, TWR/KTWR	15225as		
0745	0800	s	Albania, TWR	11865eu		
0745	0800	s	Albania, TWR	11865eu		
0745	0800	s	Monaco, TWR	9800eu		

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0827		Czech Rep, Radio Prague Intl	7345eu	9860eu	
0800	0830		Australia, ABC NT Katherine	5025do		
0800	0830		Australia, ABC NT Tennant Creek		4910do	
0800	0830		Liberia, ELWA	4760do		
0800	0830		Malaysia, Voice of	6175as	9750as	
0800	0830		Myanmar, Radio	9730do		
0800	0830		Swaziland, TWR	4775af	6120af	9500af
0800	0900	mtwhf	Albania, TWR	11865eu		
0800	0900		Anguilla, Caribbean Beacon	6090am		
0800	0900		Australia, ABC NT Alice Springs		2310irr	
			4835do			

0800	0900		Australia, CVC International	15355as	
0800	0900		Australia, HCJB	11750pa	
0800	0900		Australia, Radio	5995pa	9580pa
			9710pa	12080pa	9590pa
			17750as	13630pa	15240as
0800	0900		Bhutan, BBS	6035as	
0800	0900		Canada, CFRX Toronto ON	6070do	
0800	0900		Canada, CFVP Calgary AB	6030do	
0800	0900		Canada, CKZN St John's NF	6160do	
0800	0900		Canada, CKZU Vancouver BC	6160do	
0800	0900		China, China Radio Intl	11785eu	11880as
			15350as	15465as	17490eu
0800	0900		Costa Rica, University Network	5030va	17540as
			7375va	9725va	6150va
				11870va	
0800	0900		Eqt Guinea, Radio Africa	15190af	
0800	0900	as	Germany, Bible Voice Broadcasting		5945eu
0800	0900		Germany, Deutsche Welle	6140eu	
0800	0900	drm	Germany, Deutsche Welle	21675af	
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do
0800	0900	mtwhf	Guam, TWR/KTWR	11840as	
				15225as	
0800	0900		Guyana, Voice of	3291do	5950do
0800	0900		Indonesia, Voice of	9525as	11785pa
0800	0900	mtwhf	Italy, IRRS	13840va	15150al
0800	0900		Liberia, Star Radio	9525af	
0800	0900		Malaysia, RTM/Trax FM	7295as	
0800	0900		Malaysia, Voice of	15295as	
0800	0900	mtwhf	Monaco, TWR	9800eu	
0800	0900		New Zealand, Radio NZ Intl	9885pa	
0800	0900	drm test	New Zealand, Radio NZ Intl	9765pa	
0800	0900		Nigeria, Radio/Ibadan	6050do	
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do
0800	0900		Nigeria, Radio/Lagos	3326do	4990do
0800	0900		Papua New Guinea, Catholic Radio		4960do
0800	0900		Papua New Guinea, NBC	4890do	
0800	0900	vl	Papua New Guinea, Wantok R.Light		7120va
0800	0900		Russia, Voice of	17495oc	17665oc
0800	0900	irreg/ vl	Sierra Leone, SLBS	3316do	17805oc
0800	0900		Singapore, Mediacorp Radio	6150do	
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do
0800	0900	s	South Africa, Radio League	7205af	17700af
0800	0900		South Korea, KBS World Radio		9570as
			9640eu		
0800	0900		Taiwan, Radio Taiwan Intl	9610va	
0800	0900		UK, BBC World Service	6190af	6195as
			9740as	11760me	15280as
			15310as	15360as	15400af
			15575me	17640af	15485af
0800	0900		UK, CVC International	15640af	
0800	0900		USA, AFRTS	4319usb	5765usb
			5765usb	7812usb	12133usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
0800	0900		USA, KAIJ Dallas TX	5755na	
0800	0900		USA, KNLS Anchor Point AK	9615as	
0800	0900		USA, KTBN Salt Lake City UT	7505na	
0800	0900		USA, KWHR Naalehu HI	9930as	11565as
0800	0900		USA, WBOH Newport NC	5920am	
0800	0900		USA, WEWN Birmingham AL	5850na	7540na
			11870va		
0800	0900		USA, WHRA Greenbush ME	6135na	7465na
0800	0900		USA, WHRI Noblesville IN	5860am	5875am
			7315sa		
0800	0900		USA, WALK Bethel PA	9265eu	9955eu
0800	0900	twhfa	USA, WRMI Miami FL	7385am	
0800	0900		USA, WTJC Newport NC	9370na	
0800	0900		USA, WWCN Nashville TN	3215na	5070na
			5765na	5935na	
0800	0900		USA, WWRB Manchester TN	3185na	
0800	0900		USA, WYFR Okeechobee FL	5950am	5745am
			5985am	6855af	9930af
0800	0900	vl	Vanuatu, Radio	4960do	
0800	0900		Zambia, Christian Voice	9865af	
0815	0850	a	Albania, TWR	11865eu	
0815	0850	a	Monaco, TWR	9800eu	
0815	0900	f	Germany, Bible Voice Broadcasting		5945eu
0815	0900	as	Guam, TWR/KTWR	11840as	
0830	0900		Australia, ABC NT Katherine	2485do	
0830	0900		Australia, ABC NT Tennant Creek		2325do
0830	0900		Australia, Radio	15415as	

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0900	USA, WBCQ Kennebunk ME	5110na	7415na
0900	0915	a Germany, Bible Voice Broadcasting		5945eu
0900	0915	vl Ghana, Ghana BC Corp	3366do	4915do
0900	0920	mtwhf Albania, TWR	11865eu	
0900	0920	s Albania, TWR	11865eu	
0900	0920	s Monaco, TWR	9800eu	
0900	0930	mtwhf Guam, TWR/KTWR	11840as	
0900	0945	s Germany, Bible Voice Broadcasting		5945eu
0900	0957	China, China Radio Intl	15210pa	17490eu
		17690pa	17750as	
0900	1000	Anguilla, Caribbean Beacon	6090am	
0900	1000	Australia, ABC NT Alice Springs		2310do
		4835irr		

0900	1000		Australia, ABC NT Katherine	2485do	
0900	1000		Australia, ABC NT Tennant Creek		2325do
0900	1000		Australia, CVC International	11955as	
0900	1000		Australia, Radio 15240as	9580pa	11880as
0900	1000		Canada, CFRX Toronto ON	6070do	
0900	1000		Canada, CFVP Calgary AB	6030do	
0900	1000		Canada, CKZN St John's NF	6160do	
0900	1000		Canada, CKZU Vancouver BC	6160do	
0900	1000		Costa Rica, University Network	5030va	6150va
			7375va	9725va	13750va
0900	1000		Eqt Guinea, Radio Africa	15190af	
0900	1000		Germany, Deutsche Welle	6140eu	
0900	1000	drm/vl	Germany, Deutsche Welle	21675af	
0900	1000		Guyana, Voice of 3291do	5950do	
0900	1000	mtwhf	Italy, IRRS	13840va	
0900	1000	mtwhf	Italy, IRRS	13840va	
0900	1000		Malaysia, RTM/Trax FM	7295as	
0900	1000	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0900	1000		New Zealand, Radio NZ Intl	9885pa	
0900	1000	drm test	New Zealand, Radio NZ Intl	9765pa	
0900	1000		Nigeria, Radio/Ibadan	6050do	
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do
0900	1000		Nigeria, Radio/Lagos	3326do	4990do
0900	1000		Papua New Guinea, Catholic Radio		4960do
0900	1000		Papua New Guinea, NBC	4890do	
0900	1000	vl	Papua New Guinea, Wantok R.Light		7120va
0900	1000		Russia, Voice of 17495oc	17665oc	
0900	1000	drm	Russia, Voice of 12060eu		
0900	1000	vl	Rwanda, Radio 6055do		
0900	1000	irreg/ vl	Sierra Leone, SLBS 3316do		
0900	1000		Singapore, Mediacorp Radio	6150do	
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do
0900	1000		UK, BBC World Service	6190af	6195as
			9605as	9740as	11940af
			15280as	15310as	15360as
			15485af	15575me	17640af
			17760as	17790as	17885af
			21660as		21470af
0900	1000		USA, AFRTS	4156usb	5765usb
			5765usb	7590usb	12133usb
			12579usb	12133usb	13362usb
			13855usb		
0900	1000		USA, KAIJ Dallas TX	5755na	
0900	1000		USA, KTBN Salt Lake City UT	7505na	
0900	1000		USA, KWHR Naalehu HI	9930as	11565as
0900	1000		USA, WBCQ Kennebunk ME	5110na	7415na
0900	1000		USA, WBOH Newport NC	5920am	
0900	1000		USA, WEWN Birmingham AL	5850na	7540na
			11870va		
0900	1000		USA, WHRA Greenbush ME	6135na	
0900	1000		USA, WHRI Noblesville IN	5875am	7315sa
			7520am		
0900	1000		USA, WRMI Miami FL	9955am	
0900	1000		USA, WTJC Newport NC	9370na	
0900	1000		USA, WWCN Nashville TN	3215na	5070na
			5765na	5935na	
0900	1000		USA, WWRB Manchester TN	3185na	
0900	1000		USA, WYFR Okeechobee FL	5745am	5985am
			6885as	9450as	9755am
0900	1000	vl	Vanuatu, Radio	4960do	
0900	1000		Zambia, Christian Voice	9865af	
0930	1000		Australia, Radio	15415as	

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1029		Czech Rep, Radio Prague Intl	21745va	
1000	1030		Mongolia, Voice of 12085as		
1000	1057		China, China Radio Intl	7135as	7215as
			15190as	15210pa	17490eu
1000	1059		New Zealand, Radio NZ Intl	9885pa	17690pa
1000	1059	drm test	New Zealand, Radio NZ Intl	9765pa	
1000	1100		Anguilla, Caribbean Beacon	11775am	
1000	1100		Australia, ABC NT Alice Springs		2310do
			4835irr		
1000	1100		Australia, ABC NT Katherine	2485do	
1000	1100		Australia, ABC NT Tennant Creek		2325do
1000	1100	drm	Australia, CVC International	9760eu	
1000	1100		Australia, CVC International	11955as	
1000	1100		Australia, Radio	9580pa	9590pa
			15240as	15415as	11880as
1000	1100		Canada, CFRX Toronto ON	6070do	
1000	1100		Canada, CFVP Calgary AB	6030do	
1000	1100		Canada, CKZN St John's NF	6160do	
1000	1100		Canada, CKZU Vancouver BC	6160do	
1000	1100		Costa Rica, University Network	5030va	6150va
			7375va	9725va	11870va
					13750va
1000	1100	drm/vl	Germany, Deutsche Welle	6140eu	
1000	1100		Guyana, Voice of	3291do	5950do
1000	1100		India, All India Radio	13710oc	15020as
			15260as	15235as	17510oc
			17895oc		17800as
1000	1100	mtwhf	Italy, IRRS	13840va	
1000	1100	mtwhf	Italy, IRRS	13840va	

1000	1100		Japan, Radio Japan/NHK World	6120na	
			9695as 11730as 17585eu 17720va		
			21755oc		
1000	1100	drm	Luxembourg, Radio7145eu		
1000	1100		Malaysia, RTM/Trax FM	7295as	
1000	1100		Malaysia, Voice of	6175as 15295as	
1000	1100		Netherlands, Radio7315as	9795as	12065va
1000	1100		Nigeria, Voice of	7255af	
1000	1100		North Korea, Voice of	6185as	6285am
			9335ca 9850as		
1000	1100		Palau, KHBN	15725as	
1000	1100		Papua New Guinea, Catholic Radio		4960do
1000	1100		Papua New Guinea, NBC	4890do	
1000	1100	vl	Papua New Guinea, Wantok R.Light		7120va
1000	1100		Singapore, Mediacorp Radio	6150do	
1000	1100	vl	Solomon Islands, SIBC	5020do	9545do
1000	1100	vl	South Africa, Channel Africa	11825af	
1000	1100		UK, BBC World Service	6190af 6195va	
			9605as 9740as 11760me 11940af		
			15280as 15310as 15360as 15485af		
			15575me 17640af 17790me 17885af		
			21470af		
1000	1100	as	UK, BBC World Service	15400af 17830af	
1000	1100		USA, AFRTS	4156usb 4319usb 5765usb	
			5765usb 7590usb 7812usb 12133usb		
			12579usb 12133usb 12579usb 13362usb		
			13855usb		
1000	1100		USA, KAIJ Dallas TX	5755na	
1000	1100		USA, KNLS Anchor Point AK	9615as	
1000	1100		USA, KTBN Salt Lake City UT	7505na	
1000	1100		USA, KWHR Naalehu HI	9930as	11565as
1000	1100		USA, WBCQ Kennebunk ME	5110na	
1000	1100		USA, WBOH Newport NC	5920am	
1000	1100		USA, WEWN Birmingham AL	5850na	7540na
			11870va		
1000	1100		USA, WHRA Greenbush ME	6135na	
1000	1100		USA, WHRI Noblesville IN	6095am	7520am
			9495am		
1000	1100		USA, WRMI Miami FL	9955am	
1000	1100		USA, WTJC Newport NC	9370na	
1000	1100		USA, WWCR Nashville TN	5070na	5765na
			5935na 9985na 15825na		
1000	1100		USA, WWRB Manchester TN	3185na	
1000	1100		USA, WYFR Okeechobee FL	5950am	5985am
			6000am 6855am		
1000	1100		Zambia, Christian Voice	9865af	
1030	1045	mtwhf	Ethiopia, Radio	5990af 7110af	9704af
1030	1045		Israel, Kol Israel	15640va	
1030	1100		Australia, HCJB	15400as	
1030	1100	s	Germany, Bible Voice Broadcasting		5895as
1030	1100		Iran, Voice of the Islamic Rep	15460as 15480as	
1030	1100		UK, BBC World Service	6195as 9740as	
			11945as 15310as 17790as		

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1127		Iran, Voice of the Islamic Rep	15460as	15480as
1100	1130		Australia, HCJB	15400as	
1100	1130		Australia, Radio	15240as	
1100	1130		UK, BBC World Service	6190af 6195as	
			9740as 11760me 11855ca 11940af		
			11945as 15310as 15400af 15485af		
			15575me 17640af 17790as		
1100	1159		Germany, Overcomer Ministries		6110eu
			9855eu		
1100	1159	s	Germany, Universal Life	6055me	
1100	1200		Anguilla, Caribbean Beacon	11775am	
1100	1200		Australia, ABC NT Alice Springs		2310do
			4835irr		
1100	1200		Australia, ABC NT Katherine	2485do	
1100	1200		Australia, ABC NT Tennant Creek		2325do
1100	1200		Australia, CVC International	13635as	
1100	1200		Australia, Radio	5995pa 6020pa 9475as	
			9560as 9580pa 9590pa 11880as		
			12080pa		
1100	1200	as	Canada, CBC NQ SW Service	9625na	
1100	1200		Canada, CFRX Toronto ON	6070do	
1100	1200		Canada, CFVP Calgary AB	6030do	
1100	1200		Canada, CKZN St John's NF	6160do	
1100	1200		Canada, CKZU Vancouver BC	6160do	
1100	1200		China, China Radio Intl	5960na	13665eu
			17490eu		
1100	1200		Costa Rica, University Network	5030va 6150va	
			7375va 9725va 11870va		
1100	1200		Ecuador, HCJB	12005am 21455am	
1100	1200	drm/vl	Germany, Deutsche Welle	6140eu	
1100	1200	mtwhf	Italy, IRRS	13840va	
1100	1200		Japan, Radio Japan/NHK World		9695as
			11730as		
1100	1200	drm	Luxembourg, Radio7145eu		
1100	1200		Malaysia, RTM/Trax FM	7295as	
1100	1200		Malaysia, Voice of	6175as 15295as	
1100	1200	drm	Netherlands, Radio7240eu		
1100	1200		New Zealand, Radio NZ Intl	13840pa	
1100	1200	drm test	New Zealand, Radio NZ Intl	9460pa	

1100	1200		Nigeria, Voice of	7255af	
1100	1200		Papua New Guinea, Catholic Radio		4960do
1100	1200		Papua New Guinea, NBC	4890do	
1100	1200	vl	Papua New Guinea, Wantok R.Light		7120va
1100	1200		Singapore, Radio Singapore Intl		6080as
			6150as		
1100	1200	vl	South Africa, Channel Africa	11825af	
1100	1200		Taiwan, Radio Taiwan Intl	7445as	
1100	1200		USA, AFRTS	4156usb 4319usb 5765usb	
			5765usb 7590usb 7812usb 12133usb		
			12579usb 12133usb 12579usb 13362usb		
			13855usb		
1100	1200		USA, KAIJ Dallas TX	5755na	
1100	1200		USA, KTBN Salt Lake City UT	7505na	
1100	1200		USA, KWHR Naalehu HI	9930as	11565as
1100	1200		USA, Voice of America	15615va	
1100	1200		USA, WBOH Newport NC	5920am	
1100	1200		USA, WEWN Birmingham AL	5850na	7540na
			11870na		
1100	1200		USA, WHRA Greenbush ME	6135na	
1100	1200		USA, WHRI Noblesville IN	6095am	7520am
			9495am		
1100	1200		USA, WINB Red Lion PA	9265am	
1100	1200		USA, WRMI Miami FL	9955am	
1100	1200		USA, WTJC Newport NC	9370na	
1100	1200		USA, WWCR Nashville TN	5070na	5765na
			5935na 9985na 15825na		
1100	1200		USA, WWRB Manchester TN	3185na	
1100	1200		USA, WWRB Manchester TN	3185na	
1100	1200		USA, WYFR Okeechobee FL	5950am	5985am
			6000am 7780va 9550va 9625va		
			9755am		
1100	1200		Zambia, Christian Voice	9865af	
1105	1200		Greece, Voice of	12105eu	17525eu
1130	1157		Czech Rep, Radio Prague Intl	11640eu	21745va
1130	1159	a	Germany, Universal Life	6055me	
1130	1200		Australia, HCJB	15425as	
1130	1200	a	Germany, Bible Voice Broadcasting		15950as
1130	1200	s	Germany, Bible Voice Broadcasting		15950as
1130	1200		Guam, AWR/KSDA 11915as		
1130	1200		UK, BBC World Service	6190af 11940af	
			15485af 17640af 17830af 17885af		
			21470af		
1130	1200		Vatican City, Vatican Radio	15595va 17515va	
1145	1200	vl	Libya, Voice of Africa	17695af 21675af	
			21695af		

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200	1215	vl	Cambodia, National Radio	11940as	
1200	1228		France, Radio France Intl	15275af	21620af
1200	1230		Malaysia, Voice of	15295as	
1200	1230		UAE, AWR Africa	15110as	
1200	1230		USA, Voice of America	9645va 9760va	
			11705va 15665va		
1200	1230		Uzbekistan, Radio Tashkent	5060as	7190as
1200	1259		Canada, Radio Canada Intl	7105as	9665as
1200	1259		New Zealand, Radio NZ Intl	13840pa	
1200	1300		Anguilla, Caribbean Beacon	11775am	
1200	1300		Australia, ABC NT Alice Springs		2310do
			4835irr		
1200	1300		Australia, ABC NT Katherine	2485do	
1200	1300		Australia, ABC NT Tennant Creek		2325do
1200	1300		Australia, CVC International	13635as	
1200	1300		Australia, Radio	5995pa 6020pa 9475as	
			9560pa 9580pa 9590pa 11880pa		
1200	1300	as	Canada, CBC NQ SW Service	9625na	
1200	1300		Canada, CFRX Toronto ON	6070do	
1200	1300		Canada, CFVP Calgary AB	6030do	
1200	1300		Canada, CKZN St John's NF	6160do	
1200	1300		Canada, CKZU Vancouver BC	6160do	
1200	1300		China, China Radio Intl	5960na	13665eu
			17490eu		
1200	1300		Costa Rica, University Network	9725va 11870va	
			13750va		
1200	1300		Ecuador, HCJB	12005am 21455am	
1200	1300	drm/vl	Germany, Deutsche Welle	6140eu	
1200	1300	mtwhf	Italy, IRRS	13840va	
1200	1300	mtwhf	Italy, IRRS	13840va	
1200	1300	drm	Luxembourg, Radio7145eu		
1200	1300		Malaysia, RTM/Trax FM	7295as	
1200	1300		Malaysia, Voice of	6175as 15295as	
1200	1300		Netherlands, Radio9890na		
1200	1300	drm test	New Zealand, Radio NZ Intl	9460pa	
1200	1300		Nigeria, Voice of	7255af	
1200	1300		Papua New Guinea, Catholic Radio		4960do
1200	1300		Papua New Guinea, NBC	4890do	
1200	1300	vl	Papua New Guinea, Wantok R.Light		7120va
1200	1300		Singapore, Radio Singapore Intl		6080as
			6150as		
1200	1300		South Korea, KBS World Radio		9650na
1200	1300		Taiwan, Radio Taiwan Intl	7130as	
1200	1300		UK, BBC World Service	6190af 6195as	
			9605ca 9740as 11760me 11855ca		

		11940af	11945as	15190ca	15310as
		15485af	15575me	17640af	17790as
		17885af	21470af		
1200	1300	Ukraine, Radio Ukraine Intl	9925eu		
1200	1300	USA, AFRTS	4156usb	5765usb	
		5765usb	7590usb	7812usb	12133usb
		12579usb	12133usb	12579usb	13362usb
		13855usb			
1200	1300	USA, KAIJ Dallas TX	5755na		
1200	1300	USA, KNLS Anchor Point AK	7355as	9615as	
1200	1300	USA, KTNB Salt Lake City UT	7505na		
1200	1300	USA, KWHR Naalehu HI	9930as	12130as	
1200	1300	USA, WBCQ Kennebunk ME	9330na	18910na	
1200	1300	USA, WBOH Newport NC	5920am		
1200	1300	USA, WEWN Birmingham AL	5850na	7540na	
		11870na			
1200	1300	USA, WHRA Greenbush ME	11785na	15665na	
1200	1300	USA, WHRI Noblesville IN	6095am	7520am	
		9495am	9840am		
1200	1300	USA, WINB Red Lion PA	9265am		
1200	1300	USA, WRMI Miami FL	9955am		
1200	1300	USA, WTJC Newport NC	9370na		
1200	1300	USA, WWCR Nashville TN	5070na	5765na	
		5935na	9985na	15825na	
1200	1300	USA, WWRB Manchester TN	3185na		
1200	1300	USA, WYFR Okeechobee FL	5950am	5985am	
		17505va			
1200	1300	Zambia, Christian Voice	9865af		
1215	1300	Egypt, Radio Cairo	17835as		
1230	1245	Germany, Bible Voice Broadcasting		15950as	
1230	1300	Bangladesh, Bangla Betar	7185as		
1230	1300	Bulgaria, Radio	11700eu	15700eu	
1230	1300	Thailand, Radio	9810va		
1230	1300	USA, Voice of America	9645va	11705va	
		15665va			

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300	1329	Canada, Radio Canada Intl	9665as	9725as
1300	1330	Ecuador, HCJB	12005am	21455am
1300	1330	Egypt, Radio Cairo	17835as	
1300	1330	Uzbekistan, Radio Tashkent	5975as	7190as
1300	1356	Romania, Radio Romania Intl	15105eu	17745eu
1300	1400	Anguilla, Caribbean Beacon	11775am	
1300	1400	Australia, CVC International	13635as	
1300	1400	Australia, Radio	5995pa	6020pa
		9580pa	9590pa	9560pa
1300	1400	Canada, CBC NQ SW Service	9625na	
1300	1400	Canada, CFRX Toronto ON	6070do	
1300	1400	Canada, CFVP Calgary AB	6030do	
1300	1400	Canada, CKZN St John's NF	6160do	
1300	1400	Canada, CKZU Vancouver BC	6160do	
1300	1400	China, China Radio Intl	9570na	11760pa
		11885pa	11900pa	11980as
		13790eu	15230na	13610eu
1300	1400	Costa Rica, University Network	9725va	11870va
		13750va		
1300	1400	Germany, Deutsche Welle	6140eu	
1300	1400	Germany, Overcomer Ministries		6110eu
		9855eu		
1300	1400	Italy, IRRS	13840va	
1300	1400	Jordan, Radio	11690na	
1300	1400	Libya, Voice of Africa		21675af
1300	1400	Luxembourg, Radio7145eu		21695af
1300	1400	Malaysia, RTM/Trax FM		7295as
1300	1400	Malaysia, Voice of	6175as	
1300	1400	New Zealand, Radio NZ Intl	9870pa	
1300	1400	New Zealand, Radio NZ Intl	7230pa	
1300	1400	Nigeria, Voice of	7255af	
1300	1400	North Korea, Voice of		7570eu
		11710na	12015eu	9335na
1300	1400	Papua New Guinea, Catholic Radio		4960do
1300	1400	Papua New Guinea, NBC	4890do	
1300	1400	Papua New Guinea, Wantok R.Light		7120va
1300	1400	Poland, Radio Polonia	9525eu	11850eu
1300	1400	Singapore, Radio Singapore Intl		6080as
		6150as		
1300	1400	South Korea, KBS World Radio		9570na
		9770na		
1300	1400	UK, BBC World Service	6190af	6195as
		9740as	11760me	11940af
		15190ca	15310as	15420af
		15575me	17640af	17790as
		17885af	21470af	17830af
1300	1400	USA, AFRTS	4156usb	5765usb
		5765usb	7590usb	7812usb
		12579usb	12133usb	12579usb
		13855usb		13362usb
1300	1400	USA, KAIJ Dallas TX	5755na	
1300	1400	USA, KTNB Salt Lake City UT	7505na	
1300	1400	USA, KWHR Naalehu HI	9930as	12130as
1300	1400	USA, Voice of America	9645va	9760va
		11705va		
1300	1400	USA, WBCQ Kennebunk ME	7415na	9330na
		18910na		

1300	1400	USA, WBOH Newport NC	5920am	
1300	1400	USA, WEWN Birmingham AL	9955na	11645na
		15745na		
1300	1400	USA, WHRA Greenbush ME	11785na	15665na
1300	1400	USA, WHRI Noblesville IN	7520am	9840am
		12020am		
1300	1400	USA, WHRI Noblesville IN	9495am	
1300	1400	USA, WINB Red Lion PA	13570am	
1300	1400	USA, WRMI Miami FL	7385am	
1300	1400	USA, WTJC Newport NC	9370na	
1300	1400	USA, WWCR Nashville TN	7465na	9985na
		13845na	15825na	
1300	1400	USA, WWRB Manchester TN	9385na	
1300	1400	USA, WYFR Okeechobee FL	7580as	11560as
		11830am	11865am	11910am
				11830am
1300	1400	Zambia, Christian Voice	9865af	
1305	1320	Austria, Radio Austria Intl	17885va	
1305	1330	Austria, Radio Austria Intl	17855va	
1330	1400	Australia, HCJB	15405as	
1330	1400	Guam, AWR/KSDA	15660as	
1330	1400	Guam, TWR/KTWR	9585as	
1330	1400	India, All India Radio		9690as
		13710as		11620as
1330	1400	Laos, National Radio	7145as	
1330	1400	Sweden, Radio	7420va	11550va
1330	1400	Turkey, Voice of	11735va	15155eu
1345	1400	Austria, Radio Austria Intl	17855va	
1350	1400	Turkmenistan, Turkmen Radio	5015eu	

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1415	Russia, FEBA	7370as	
1400	1429	Czech Rep, Radio Prague Intl		11600as
1400	1430	Canada, Radio Canada Intl		21745na
1400	1430	Germany, Pan American BC		7240eu
1400	1430	Thailand, Radio	9725va	13820as
1400	1430	Turkey, Voice of	11735oc	15155eu
1400	1500	Anguilla, Caribbean Beacon		11775am
1400	1500	Australia, CVC International		13635as
1400	1500	Australia, HCJB	15390as	
1400	1500	Australia, Radio	5995pa	6020pa
		7240pa	9590pa	9625as
1400	1500	Canada, CBC NQ SW Service		11750as
1400	1500	Canada, CFRX Toronto ON		9625na
1400	1500	Canada, CFVP Calgary AB		6070do
1400	1500	Canada, CKZN St John's NF		6030do
1400	1500	Canada, CKZU Vancouver BC		6160do
1400	1500	Canada, Radio Canada Intl		6160do
		17820am		9515am
1400	1500	China, China Radio Intl		13655am
		9795eu		
		11765as		9560as
		13675na	13685af	9700eu
		17630af		11775as
1400	1500	Costa Rica, University Network		13740na
		13750va		15230na
1400	1500	France, Radio France Intl		9725va
		17515as		11870va
1400	1500	Germany, Bible Voice Broadcasting		7180as
1400	1500	Germany, Deutsche Welle		9580as
1400	1500	Germany, Overcomer Ministries		13645as
		9855eu	13810eu	6140eu
1400	1500	Guam, TWR/KTWR	9975as	6110eu
1400	1500	India, All India Radio		
		13710as		9690as
1400	1500	Italy, IRRS	13840va	11620as
1400	1500	Japan, Radio Japan/NHK World		
		9875as	11840oc	7200as
1400	1500	Jordan, Radio		
		11690na		
1400	1500	Luxembourg, Radio7145eu		
1400	1500	Malaysia, RTM/Trax FM		7295as
1400	1500	Malaysia, Voice of	6175as	
1400	1500	Netherlands, Radio9345as		12080as
1400	1500	Netherlands, Radio15735eu		15595as
1400	1500	New Zealand, Radio NZ Intl		
1400	1500	New Zealand, Radio NZ Intl		9870pa
1400	1500	Nigeria, Voice of	7255af	7230pa
1400	1500	Oman, Radio Oman		
1400	1500	Papua New Guinea, Wantok R.Light		15140as
1400	1500	Russia, Voice of	5820eu	7120va
1400	1500	Singapore, Mediacorp Radio		
1400	1500	South Africa, Channel Africa		6150do
1400	1500	Taiwan, Radio Taiwan Intl		11825af
1400	1500	UK, BBC World Service		15265as
		6195as	9740as	5970as
		12095eu	15310as	6190af
		15575me	17640af	11940af
		21470af	21660af	15485af
1400	1500	UK, BBC World Service		17790as
		5765usb	7590usb	17830af
1400	1500	USA, AFRTS	4156usb	
1400	1500	USA, KAIJ Dallas TX		12095af
1400	1500	USA, KJES Vado NM		4319usb
1400	1500	USA, KNLS Anchor Point AK		5765usb
1400	1500	USA, KTNB Salt Lake City UT		7812usb
		12579usb	12133usb	12133usb
		13855usb		12579usb
				13362usb
1400	1500	USA, KAIJ Dallas TX		13815na
1400	1500	USA, KJES Vado NM		11715na
1400	1500	USA, KNLS Anchor Point AK		9655as
1400	1500	USA, KTNB Salt Lake City UT		7505na

1400	1500		USA, KWHR Naalehu HI	9930as	
1400	1500		USA, Voice of America	7125va	9645va
			9760va		
1400	1500		USA, WBCQ Kennebunk ME	7415na	9330na
			18910na		
1400	1500		USA, WBOH Newport NC	5920am	
1400	1500		USA, WEWN Birmingham AL	9955na	11645na
			15745na		
1400	1500		USA, WHRA Greenbush ME	11530na	15665na
1400	1500	as	USA, WHRI Noblesville IN	9495am	15105am
1400	1500		USA, WHRI Noblesville IN	9840am	11785am
			12020am	13790am	
1400	1500		USA, WINB Red Lion PA	13570am	
1400	1500		USA, WRMI Miami FL	7385am	
1400	1500		USA, WTJC Newport NC	9370na	
1400	1500		USA, WWCR Nashville TN	7465na	9985na
			13845na	15825na	
1400	1500		USA, WWRB Manchester TN	9385na	
1400	1500		USA, WYFR Okeechobee FL	7580as	11560as
			11830am	11910am	
1400	1500		Zambia, Christian Voice	9865af	
1415	1430		Nepal, Radio	3230as	5005as
			7165as		6100as
1430	1445	s	Germany, Pan American BC	13800as	
1430	1500		Australia, Radio	9475as	11660as
1430	1500	drm	South Korea, KBS World Radio		9770eu
1430	1500		Sweden, Radio	11550va	

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1500		France, Radio France Intl	7180as	17515as
1500	1515		Russia, FEBA	7340as	
1500	1515	vl	Turkmenistan, Turkmen Radio	5015eu	
1500	1530		Australia, HCJB	15425as	
1500	1530		Mongolia, Voice of 12015eu		
1500	1530		UK, BBC World Service	6190af	11860af
			11940af	12095af	15400af
			15485af	17830af	21490af
1500	1530	drm	Vatican City, Vatican Radio	7240eu	
1500	1545	as	Germany, Bible Voice Broadcasting		13645as
1500	1557		Canada, Radio Canada Intl	9635as	11975as
1500	1600		Anguilla, Caribbean Beacon	11775am	
1500	1600		Australia, CVC International	13635as	
1500	1600		Australia, Radio	5995pa	6080as
			9475as	9590pa	9625as
1500	1600	as	Canada, CBC NQ SW Service	9625na	
1500	1600		Canada, CFRX Toronto ON	6070do	
1500	1600		Canada, CFVP Calgary AB	6030do	
1500	1600		Canada, CKZN St John's NF	6160do	
1500	1600		Canada, CKZU Vancouver BC	6160do	
1500	1600		Canada, Radio Canada Intl	9515am	13655am
			17820 qm		
1500	1600		China, China Radio Intl	6100af	7160as
			9435eu	9525eu	9785as
			13685na	13740af	17630af
1500	1600		Costa Rica, University Network	9725va	11870va
			13750va		
1500	1600	a	Germany, Bible Voice Broadcasting		12035as
1500	1600		Germany, Deutsche Welle	6140eu	
1500	1600	a	Germany, Overcomer Ministries		6110eu
			9855eu	13810eu	
1500	1600	a	Greece, Voice of	9420va	9775va
			15485va	15630va	
1500	1600	mtwhf	Italy, IRRS	13840va	
1500	1600		Japan, Radio Japan/NHK World		6190as
			7200as	9505am	9875as
1500	1600		Jordan, Radio	11690na	
1500	1600	drm	Luxembourg, Radio7145eu		
1500	1600		Malaysia, RTM/Trax FM	7295as	
1500	1600		Malaysia, Voice of	6175as	
1500	1600		Netherlands, Radio9345as		12080as
1500	1600		New Zealand, Radio NZ Intl	9870pa	
1500	1600	drm test	New Zealand, Radio NZ Intl	7230pa	
1500	1600		North Korea, Voice of	7570eu	9335na
			11710na	12015eu	
1500	1600	vl	Papua New Guinea, Wantok R.Light		7120va
1500	1600		Russia, Voice of	6205as	7260as
			7415as		7350as
1500	1600	drm	Russia, Voice of	5820eu	
1500	1600		Singapore, Mediacorp Radio	6150do	
1500	1600	vl	South Africa, Channel Africa	17770af	
1500	1600	drm/ f	Taiwan, Radio Taiwan Intl	9770eu	
1500	1600		UK, BBC World Service	5970as	5975as
			6195as	9740as	12095eu
			15565eu	17640eu	17790as
1500	1600		UK, CVC International	15680af	
1500	1600	vl/ mtwhf	UK, Sudan Radio Service	15575va	
1500	1600		USA, AFRTS	4156usb	4319usb
			5765usb	7590usb	7812usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
1500	1600		USA, KAIJ Dallas TX	13815na	
1500	1600		USA, KJES Vado NM	11715na	
1500	1600		USA, KTNB Salt Lake City UT	7505na	
1500	1600		USA, KWHR Naalehu HI	9930as	

1500	1600		USA, Voice of America	6110va	7125va
			7175va	9645va	9685va
			13600af	13865af	15460va
			17895af		17715af
1500	1600		USA, WBCQ Kennebunk ME	7415na	9330na
			18910na		
1500	1600		USA, WBOH Newport NC	5920am	
1500	1600		USA, WEWN Birmingham AL	9955na	11645na
			15745na		
1500	1600		USA, WHRA Greenbush ME	11530na	15665na
1500	1600		USA, WHRI Noblesville IN	9840am	11785am
			13760am	13790am	
1500	1600	as	USA, WHRI Noblesville IN	15105am	
1500	1600		USA, WINB Red Lion PA	13570am	
1500	1600		USA, WRMI Miami FL	7385am	
1500	1600		USA, WTJC Newport NC	9370na	
1500	1600		USA, WWCR Nashville TN	9985na	13845na
			12160na	13845na	15825na
1500	1600		USA, WWRB Manchester TN	9385na	11915na
1500	1600		USA, WYFR Okeechobee FL	6280as	11830am
			11910am	15520as	15770va
1500	1600		Zambia, Christian Voice	9865af	
1515	1545		Russia, FEBA	7340as	
1530	1600	mh	Germany, Bible Voice Broadcasting		12035as
1530	1600		Iran, Voice of the Islamic Rep	7330as	9940as
1530	1600	vl	UAE, AWR Africa	7480as	
1530	1600		UK, BBC World Service	6190af	11940af
			12095af	15400af	15485af
			21470af	21660af	17830af
1530	1600		Vatican City, Vatican Radio	9310as	11850as
			13765as		
1545	1600	w	Germany, Bible Voice Broadcasting		12035as
1545	1600	s	Germany, Pan American BC	13820me	

1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600	1615		Pakistan, Radio	6215as	9375af
			15725af		11570af
1600	1615		UK, BBC World Service	6190af	11940af
			12095af	15400af	15485af
			17830af	21660af	17820af
1600	1627		Iran, Voice of the Islamic Rep	7330as	9940as
1600	1628	s	Hungary, Radio Budapest	6025eu	9565eu
1600	1629	a	Germany, Universal Life	15640me	
1600	1630	s	Germany, Pan American BC	13820me	
1600	1630		Guam, AWR/KSDA 9585as	12065as	
1600	1630		Myanmar, Radio	9730do	
1600	1650	drm test	New Zealand, Radio NZ Intl	7230pa	
1600	1659		Canada, Radio Canada Intl	9515am	13655am
			17870am		
1600	1659	vl/ mtwhf	UK, Sudan Radio Service	15575va	
1600	1700		Anguilla, Caribbean Beacon	11775am	
1600	1700		Australia, CVC International	13635as	
1600	1700		Australia, Radio	5995pa	6080as
			9475as	9710pa	11660as
1600	1700	a	Canada, CBC NQ SW Service	9625na	
1600	1700		Canada, CFRX Toronto ON	6070do	
1600	1700		Canada, CFVP Calgary AB	6030do	
1600	1700		Canada, CKZN St John's NF	6160do	
1600	1700		Canada, CKZU Vancouver BC	6160do	
1600	1700		China, China Radio Intl	6100af	7255eu
			9435eu	9525eu	9570af
1600	1700		Costa Rica, University Network	11870va	13750va
1600	1700		Ethiopia, Radio	5990af	7110af
			9560af	9704af	11800af
1600	1700		France, Radio France Intl	9730va	11615va
			15160va	15365va	15605va
1600	1700		Germany, Deutsche Welle	6170as	9795as
			11695as	15410as	
1600	1700	drm/vl	Germany, Deutsche Welle	6140eu	
1600	1700	a	Germany, Overcomer Ministries		9855eu
1600	1700	mtwhf	Italy, IRRS	5775va	
1600	1700		Jordan, Radio	11690na	
1600	1700	drm	Luxembourg, Radio7145eu		
1600	1700		Malaysia, RTM/Trax FM	7295as	
1600	1700		Malaysia, Voice of	6175as	
1600	1700		New Zealand, Radio NZ Intl	9870pa	
1600	1700		North Korea, Voice of	9990va	11545va
1600	1700	vl	Papua New Guinea, Wantok R.Light		7120va
1600	1700		Russia, Voice of	4965as	4975as
			6130eu	7260as	7320eu
			9470me		7415as
1600	1700		South Korea, KBS World Radio		5975va
1600	1700		Taiwan, Radio Taiwan Intl	11815as	
1600	1700		UK, BBC World Service	3915as	5975as
			6195as	7160as	7285eu
			9740as	12095eu	15105eu
1600	1700		UK, CVC International	15680af	
1600	1700		USA, AFRTS	4156usb	4319usb
			5765usb	7590usb	7812usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
1600	1700		USA, KAIJ Dallas TX	13815na	
1600	1700		USA, KJES Vado NM	11715na	
1600	1700		USA, KTNB Salt Lake City UT	7505na	
1600	1700		USA, KWHR Naalehu HI	9930as	

1600	1700		USA, KWHR Naalehu HI	9930as	
1600	1700		USA, Voice of America	4930af	9685va
			11835va	13600va	15240af
			17715af	17895af	17640va
1600	1700	mtwhf	USA, Voice of America	6160va	7125va
			9645va	9760va	
1600	1700		USA, WBCQ Kennebunk ME	7415na	9330na
			18910na		
1600	1700		USA, WBOH Newport NC	5920am	
1600	1700		USA, WEWN Birmingham AL	11645va	13615va
			15745va	15785va	
1600	1700		USA, WHRA Greenbush ME	11530na	17650na
1600	1700		USA, WHRI Noblesville IN	9840am	13760am
			15105am		
1600	1700		USA, WINB Red Lion PA	13570am	
1600	1700	mtwhfa	USA, WMLK Bethel PA	9265eu	
1600	1700		USA, WRMI Miami FL	9955am	
1600	1700		USA, WTJC Newport NC	9370na	
1600	1700		USA, WWCR Nashville TN	9985na	12160na
			13845na	15825na	
1600	1700		USA, WWRB Manchester TN	9385na	11915na
1600	1700		USA, WYFR Okeechobee FL	6085va	11830am
			11865am	12010as	13695as
			12095va	18980va	21455af
					21525af
1600	1700		Zambia, Christian Voice	9865af	
1605	1620	asm	Austria, Radio Austria Intl	13675na	
1615	1630	twfh	Austria, Radio Austria Intl	13675na	
1615	1700		UK, BBC World Service	6190af	11940af
			12095af	15400af	15420af
			17820af	21660af	
1615	1700	as	UK, BBC World Service	11860af	21490af
1630	1700		Egypt, Radio Cairo	11785af	
1630	1700	s	Germany, Bible Voice Broadcasting		9460me
1630	1700		Guam, AWR/KSDA 11980as		
1630	1700	vl	UAE, AWR Africa	7480as	
1640	1700	mtwhf	Germany, Bible Voice Broadcasting		9460me
1645	1700	m	Austria, Radio Austria Intl	13675na	
1645	1700	a	Germany, Bible Voice Broadcasting		9460me
1651	1700	drm test	New Zealand, Radio NZ Intl	11745pa	

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700	1710	mtwh	Moldova, Radio PMR	5960eu	
1700	1715	mtwf	Germany, Bible Voice Broadcasting		9460me
1700	1720	f	Moldova, Radio PMR	5960eu	
1700	1727		Czech Rep, Radio Prague Intl	5930eu	15710af
1700	1730		France, Radio France Intl	11615va	15605va
1700	1730		Jordan, Radio	11690na	
1700	1730		Swaziland, TWR	3200af	
1700	1745	h	Germany, Bible Voice Broadcasting		9460me
1700	1750		New Zealand, Radio NZ Intl	9870pa	
1700	1750	drm test	New Zealand, Radio NZ Intl	11745pa	
1700	1800		Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, CVC International	13635as	
1700	1800		Australia, Radio	5995pa	7240pa
			9475as	9580pa	11880pa
1700	1800	a	Canada, CBC NQ SW Service	9625na	
1700	1800		Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CFVP Calgary AB	6030do	
1700	1800		Canada, CKZN St John's NF	6160do	
1700	1800		Canada, CKZU Vancouver BC	6160do	
1700	1800		China, China Radio Intl	6100eu	7255eu
			9570af	11900af	
1700	1800		Costa Rica, University Network	11870va	13750va
1700	1800		Egypt, Radio Cairo	11785af	
1700	1800		Eqt Guinea, Radio Africa	15190af	
1700	1800	as	Germany, Bible Voice Broadcasting		9460me
1700	1800	drm/vl	Germany, Deutsche Welle	6140eu	
1700	1800	drm/vl	Germany, Deutsche Welle	6140eu	
1700	1800	mtwhf	Italy, IRRS	5775va	
1700	1800		Japan, Radio Japan/NHK World		9535am
			11970eu	15355va	
1700	1800	drm	Luxembourg, Radio	7145eu	
1700	1800		Malaysia, RTM/Trax FM	7295as	
1700	1800		Malaysia, Voice of	6175as	
1700	1800		Nigeria, Voice of	15120va	
1700	1800	vl	Papua New Guinea, Wantok R.Light		7120va
1700	1800		Russia, Voice of	5910as	7320eu
			7415as	9470me	7360va
1700	1800		South Africa, Channel Africa	15285af	
1700	1800		Taiwan, Radio Taiwan Intl	11850af	
1700	1800		UK, BBC World Service	3915as	5975as
			6195eu	7160as	9410eu
			12095eu	15105eu	15310as
1700	1800		UK, CVC International	15680af	
1700	1800	vl/ mtwhf	UK, Sudan Radio Service	11705va	
1700	1800		USA, AFRTS	4156usb	4319usb
			5765usb	7590usb	7812usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
1700	1800		USA, KAIJ Dallas TX	13815na	
1700	1800		USA, KTBN Salt Lake City UT	15590na	
1700	1800		USA, KWHR Naalehu HI	9930as	
1700	1800		USA, Voice of America	13710af	15240af
			15445af		
1700	1800	as	USA, Voice of America	4930af	

1700	1800		USA, WBCQ Kennebunk ME	7415na	9330na
			18910na		
1700	1800		USA, WBOH Newport NC	5920am	
1700	1800		USA, WEWN Birmingham AL	11645va	13615va
			15745va	15785va	
1700	1800		USA, WHRA Greenbush ME	11530na	17650na
1700	1800		USA, WHRI Noblesville IN	9840am	11885am
			13760am	15105am	
1700	1800	mtwhfa	USA, WINB Red Lion PA	13570am	
1700	1800	mtwhfa	USA, WMLK Bethel PA	9265eu	15265eu
1700	1800		USA, WMLK Bethel PA	9265eu	15265eu
1700	1800		USA, WRMI Miami FL	9955am	
1700	1800		USA, WTJC Newport NC	9370na	
1700	1800		USA, WWCR Nashville TN	9985na	12160na
			13845na	15825na	
1700	1800		USA, WWRB Manchester TN	9385na	11915na
			15250na		
1700	1800		USA, WYFR Okeechobee FL	3955af	13695am
			17795va	18980va	21455af
1700	1800		Zambia, Christian Voice	4965af	
1715	1730		Vatican City, Vatican Radio	4005va	5885va
			7250va	9645va	9755va
1730	1745	vl	Libya, Voice of Africa		11860af
1730	1745	f	Russia, FEBA	7345as	
1730	1745	mtwhf	UK, United Nations Radio	17810af	7170af
					9565me
1730	1800		Guam, AWR/KSDA 9980me		
1730	1800		Liberia, ELWA	4760do	
1730	1800		Philippines, Radio Pilipinas		11720va
			17720va		15190va
1730	1800		Slovakia, Radio Slovakia Intl	5915eu	6055eu
1730	1800		Swaziland, TWR	3200af	9500af
1730	1800		USA, Voice of America	9830af	12080af
			17785af		
1730	1800		Vatican City, Vatican Radio	9755af	11625af
			13765af		
1745	1800		Bangladesh, Bangla Betar	7185eu	
1745	1800	t	Germany, Bible Voice Broadcasting		9460me
1745	1800		India, All India Radio	7410eu	9445eu
			9950eu	11620eu	11935af
			15075af	15155as	17670af
1745	1800	vl	Libya, Voice of Africa		15220af
			15660af	17695af	15615af
1745	1800		UK, BBC World Service	3255af	6190af
			6195af	12095af	15420af
			17820af	17830af	21470af
1751	1800		New Zealand, Radio NZ Intl	11980pa	
1751	1800	drm test	New Zealand, Radio NZ Intl	11610pa	

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1810		Zanzibar, Radio Tanzania	11735af	
1800	1815	a	Germany, Bible Voice Broadcasting		7210me
1800	1827		Czech Rep, Radio Prague Intl	5930eu	9400va
1800	1829	s	Germany, Universal Life	15675af	
1800	1830	w f	Austria, AWR Europe	9815af	
1800	1830		Egypt, Radio Cairo	11785af	
1800	1830	a	Germany, Bible Voice Broadcasting		9460me
1800	1830		South Africa, AWR Africa	3215af	3345af
			11925af		
1800	1830		Swaziland, TWR	3200af	9500af
1800	1830		UK, BBC World Service	3255af	5975as
			6190af	6195af	9740as
			13700af		12095af
1800	1830	as	USA, Voice of America	4930af	
1800	1830		USA, Voice of America	6035af	11975af
			13710af	15240af	17895af
1800	1830		Vietnam, Voice of	5955eu	
1800	1850		New Zealand, Radio NZ Intl	11980pa	
1800	1850	drm test	New Zealand, Radio NZ Intl	11610pa	
1800	1856		Romania, Radio Romania Intl	7120eu	9640eu
1800	1859		Canada, Radio Canada Intl	7185af	9770af
			11875af	17740af	
1800	1900		Anguilla, Caribbean Beacon	11775am	
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu
1800	1900		Australia, Radio	6080pa	7240pa
			9580pa	9710pa	11880pa
1800	1900		Canada, CFRX Toronto ON	6070do	
1800	1900		Canada, CFVP Calgary AB	6030do	
1800	1900		Canada, CKZN St John's NF	6160do	
1800	1900		Canada, CKZU Vancouver BC	6160do	
1800	1900		China, China Radio Intl	6100eu	
1800	1900		Costa Rica, University Network	11870va	13750va
1800	1900		Eqt Guinea, Radio Africa	15190af	
1800	1900	fs	Germany, Bible Voice Broadcasting		9460me
1800	1900	as	Germany, Bible Voice Broadcasting		9730me
1800	1900	drm/vl	Germany, Deutsche Welle	6140eu	
1800	1900		India, All India Radio	7410eu	9445eu
			9950eu	11620eu	11935af
			15075af	15155as	17670af
1800	1900		Liberia, ELWA	4760do	
1800	1900		Malaysia, RTM/Trax FM	7295as	
1800	1900		Malaysia, Voice of	6175as	
1800	1900		Netherlands, Radio6020af	9895af	11655af
1800	1900		Nigeria, Voice of	15120va	

1800	1900		North Korea, Voice of	7570eu	12015eu
1800	1900	vl	Papua New Guinea, Wantok R.Light	7120va	
1800	1900		Philippines, Radio Pilipinas	11720va	15190va
			17720va		
1800	1900		Poland, Radio Polonia	7220eu	7265eu
1800	1900		Russia, Voice of	5910as	7360va
			11519af	7415as	
1800	1900		Taiwan, Radio Taiwan Intl	3965eu	
1800	1900		UK, BBC World Service	6195eu	9410eu
			12095eu		
1800	1900		UK, CVC International	9765af	
1800	1900		USA, AFRTS	4156usb	4319usb
			5765usb	7590usb	5765usb
			12579usb	12133usb	12133usb
			13855usb	12579usb	13362usb
1800	1900		USA, KAIJ Dallas TX	13815na	
1800	1900		USA, KTBN Salt Lake City UT	15590na	
1800	1900		USA, KWHR Naalehu HI	9930as	
1800	1900		USA, WBCQ Kennebunk ME	7415na	9330na
			18910na		
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	11645va	13615va
			15745va	15785va	
1800	1900		USA, WHRA Greenbush ME	11530na	17650na
1800	1900		USA, WHRI Noblesville IN	9840am	11885am
			15105am		
1800	1900		USA, WINB Red Lion PA	13570am	
1800	1900	mtwhfa	USA, WMLK Bethel PA	9265eu	15265eu
1800	1900		USA, WRMI Miami FL	9955am	
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCR Nashville TN	9985na	12160na
			13845na	15825na	
1800	1900		USA, WWRB Manchester TN	9385na	11915na
			15250na		
1800	1900		USA, WYFR Okeechobee FL	3955va	7240me
			7425am	13695am	13800am
			17795va	18980va	17525am
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1800	1900		Zambia, Christian Voice	4965af	
1815	1830	vl	Libya, Voice of Africa	9485af	11615af
			11635af	11715af	11860af
1815	1900		Bangladesh, Bangla Betar	7185as	
1830	1845		Israel, Kol Israel	7545va	9345va
1830	1900		Bulgaria, Radio	5800eu	7500eu
1830	1900		Swaziland, TWR	3200af	
1830	1900		Sweden, Radio	6065va	
1830	1900		UK, BBC World Service	3255af	5975me
			6005af	6190af	9410af
			9740me	11945af	12095af
			15400af	15470af	13700af
1830	1900		USA, Voice of America	4930af	6035af
			11975af	13710af	15240af
1845	1900		Congo, RTV Congolaise	4765af	5985af
1851	1900	drm test	New Zealand, Radio NZ Intl	13595pa	
1851	1900		New Zealand, Radio NZ Intl	15720pa	

1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

1900	1915		Congo, RTV Congolaise	4765af	5985af
1900	1929	s	Germany, Universal Life	7105me	
1900	1930	a	Germany, Bible Voice Broadcasting	6015af	
			9460me		
1900	1930		Lithuania, Radio Vilnius	9710eu	
1900	1930		Philippines, Radio Pilipinas	11720va	15190va
			17720va		
1900	1945		India, All India Radio	7410eu	9445eu
			9950eu	11620eu	11935af
			15075af	15155as	17670af
1900	2000		Anguilla, Caribbean Beacon	11775am	
1900	2000		Australia, Radio	6080pa	7240pa
			9580pa	9710pa	11880pa
1900	2000		Canada, CFRX Toronto ON	6070do	
1900	2000		Canada, CFVP Calgary AB	6030do	
1900	2000		Canada, CKZN St John's NF	6160do	
1900	2000		Canada, CKZU Vancouver BC	6160do	
1900	2000		China, China Radio Intl	7295va	9440af
1900	2000		Costa Rica, University Network	11870va	13750va
1900	2000		Eqt Guinea, Radio Africa	15190af	
1900	2000	as	Germany, Bible Voice Broadcasting	6015eu	
			9460me		
1900	2000		Germany, Deutsche Welle	11865af	12025af
			15470af		
1900	2000		Germany, Overcomer Ministries	9495af	
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do
1900	2000		Liberia, ELWA	4760do	
1900	2000		Malaysia, RTM/Trax FM	7295as	
1900	2000	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
1900	2000		Netherlands, Radio7120af	9895af	11655af
1900	2000	as	Netherlands, Radio15315na	15525na	17735na
1900	2000		New Zealand, Radio NZ Intl	15720pa	
1900	2000	drm test	New Zealand, Radio NZ Intl	13595pa	
1900	2000		Nigeria, Radio/Ibadan	6050do	
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do
1900	2000		Nigeria, Radio/Lagos	3326do	4990do

1900	2000		Nigeria, Voice of	15120va	
1900	2000		North Korea, Voice of	7100af	9975va
			11535va	11910af	
1900	2000		Papua New Guinea, Catholic Radio		4960do
1900	2000		Papua New Guinea, NBC	4890do	
1900	2000	vl	Papua New Guinea, Wantok R.Light	7120va	
1900	2000		Russia, Voice of	6175eu	7335af
			11510af		
1900	2000	irreg/ vl	Sierra Leone, SLBS 3316do		
1900	2000	vl	Solomon Islands, SIBC	5020do	9545do
1900	2000	vl	South Africa, Channel Africa	3345af	
1900	2000	m	South Africa, Radio League	3215af	
1900	2000		South Korea, KBS World Radio		5975va
			7275eu		
1900	2000	a	Sri Lanka, SLBC	6010eu	
1900	2000		Swaziland, TWR	3200af	
1900	2000	drm	Sweden, Radio	11805eu	
1900	2000		Thailand, Radio	9805eu	
1900	2000	vl	Uganda, Radio	4976do	5026do
1900	2000		UK, BBC World Service	3255af	5975me
			6005af	6190af	6195va
			9630af	9740me	12095af
			15400af	15420af	17830af
1900	2000		UK, CVC International	9765af	
1900	2000		USA, AFRTS	4156usb	4319usb
			5765usb	7590usb	5765usb
			12579usb	12133usb	12579usb
			13855usb	12579usb	13362usb
1900	2000		USA, KAIJ Dallas TX	13815na	
1900	2000		USA, KJES Vado NM	15385na	
1900	2000		USA, KTBN Salt Lake City UT	15590na	
1900	2000		USA, Voice of America	4930af	4940af
			6035af	9785va	11975af
			13710af	15240af	15580af
1900	2000		USA, WBCQ Kennebunk ME	7415na	9330na
			18910na		
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Birmingham AL	11645va	13615va
			15745va	15785va	
1900	2000		USA, WHRA Greenbush ME	11530na	15665na
1900	2000		USA, WHRI Noblesville IN	9840am	11885am
			15285am	15665am	
1900	2000		USA, WINB Red Lion PA	13570am	
1900	2000	mtwhfa	USA, WMLK Bethel PA	9265eu	15265eu
1900	2000		USA, WRMI Miami FL	9955am	
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCR Nashville TN	9975na	9985na
			12160na	13845na	15825na
1900	2000		USA, WWRB Manchester TN	9385na	11915na
			15250na		
1900	2000		USA, WYFR Okeechobee FL	3230af	6020af
			6085va	17845af	18930va
1900	2000		Zambia, Christian Voice	4965af	
1900	2000	vl	Zimbabwe, ZBC Corp	5975do	
1915	1930	vl	Libya, Voice of Africa	11635af	11715af
1915	2000	f	Germany, Bible Voice Broadcasting		9460me
1925	1945		Armenia, Voice of	4810eu	9965as
1930	1945	vl	Libya, Voice of Africa	11715af	
1930	2000	s	Germany, Bible Voice Broadcasting		7260af
1930	2000	a	Germany, Pan American BC	7260af	
1930	2000		Greece, Voice of	7430eu	
1930	2000		Iran, Voice of the Islamic Rep	6010eu	7320eu
			9855af	11695af	
1930	2000		Serbia & Montenegro, Intl Radio		6100eu
1930	2000		Slovakia, Radio Slovakia Intl	5915eu	7345eu
1930	2000		Turkey, Voice of	6055eu	
1935	1955		Italy, RAI Intl	6035eu	9760eu
1945	2000	mtwhfa	Albania, Radio Tirana	6225eu	7530eu
1945	2000	vl	Rwanda, Radio	6055do	

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2015	s	Germany, Bible Voice Broadcasting	6015eu	
2000	2015	s	Germany, Pan American BC	7260af	
2000	2025		Israel, Kol Israel	7545va	15640af
2000	2027		Iran, Voice of the Islamic Rep	6010eu	7320eu
			9855af	11695af	
2000	2028		Hungary, Radio Budapest	3975eu	6025eu
2000	2030	s	Germany, Bible Voice Broadcasting		6015eu
2000	2030		Mongolia, Voice of	12015eu	
2000	2030		South Africa, AWR Africa	9655af	
2000	2030		Swaziland, TWR	3200af	
2000	2030		Turkey, Voice of	6055eu	
2000	2030		Vatican City, Vatican Radio	7365af	9755af
			11625af		
2000	2100		Anguilla, Caribbean Beacon	11775am	
2000	2100		Australia, ABC NT Alice Springs		2310do
			4835irr		
2000	2100		Australia, ABC NT Katherine	2485do	
2000	2100		Australia, ABC NT Tennant Creek		2325do
2000	2100		Australia, Radio	9500as	11650pa
			11880pa	12080pa	
2000	2100	as	Australia, Radio	6080pa	7240pa
2000	2100		Canada, CFRX Toronto ON	6070do	
2000	2100		Canada, CFVP Calgary AB	6030do	

2000	2100	Canada, CKZN St John's NF	6160do	
2000	2100	Canada, CKZU Vancouver BC	6160do	
2000	2100	China, China Radio Intl	5960eu	7190eu
		7285eu	7295va	9440va
		9600eu	11640af	13630af
2000	2100	Costa Rica, University Network	13750va	
2000	2100	Eqt Guinea, Radio Africa	15190af	
2000	2100	Germany, Deutsche Welle	6145af	9675af
		9735af	9830af	12025af
2000	2100	Ghana, Ghana BC Corp	3366do	4915do
2000	2100	Indonesia, Voice of	9525as	11785pa
2000	2100	Italy, IRRS	5775va	
2000	2100	Liberia, ELWA	4760do	
2000	2100	Malaysia, RTM/Trax FM	7295as	
2000	2100	Namibia, Namibian BC Corp	3270do	3290do
		6060do	6175do	
2000	2100	Netherlands, Radio 7120af	9895af	11655af
		17810af		
2000	2100	Netherlands, Radio 15315na	15525na	17725na
2000	2100	New Zealand, Radio NZ Intl	15720pa	
2000	2100	New Zealand, Radio NZ Intl	13595pa	
2000	2100	Nigeria, Radio/Ibadan	6050do	
2000	2100	Nigeria, Radio/Kaduna	4770do	6090do
2000	2100	Nigeria, Radio/Lagos	3326do	4990do
2000	2100	Nigeria, Voice of	15120va	
2000	2100	Papua New Guinea, Catholic Radio		4960do
2000	2100	Papua New Guinea, NBC	4890do	
2000	2100	Papua New Guinea, Wantok R.Light		7120va
2000	2100	Russia, Voice of	5820eu	
2000	2100	Russia, Voice of	6145eu	7290eu
		15735ca		7330eu
2000	2100	Solomon Islands, SIBC	5020do	9545do
2000	2100	South Africa, Channel Africa	3345af	
2000	2100	South Korea, KBS World Radio		3955eu
2000	2100	Spain, Radio Exterior Espana	9595af	9680eu
2000	2100	Uganda, Radio	4976do	5026do
2000	2100	UK, BBC World Service	3255af	6005af
		6190af	6195va	9410va
		12095af	15400af	17830af
2000	2100	UK, CVC International	7285af	
2000	2100	USA, AFRTS	4156usb	5765usb
		5765usb	7590usb	7812usb
		12579usb	12133usb	12579usb
		13855usb		13362usb
2000	2100	USA, KAIJ Dallas TX	13815na	
2000	2100	USA, KJES Vado NM	15385na	
2000	2100	USA, KTBN Salt Lake City UT	15590na	
2000	2100	USA, WBCQ Kennebunk ME	7415na	9330na
		18910na		
2000	2100	USA, WBOH Newport NC	5920am	
2000	2100	USA, WEWN Birmingham AL	11645va	13615va
		15745va	15785va	
2000	2100	USA, WHRA Greenbush ME	11530na	15665na
2000	2100	USA, WHRI Noblesville IN	9840am	11885am
		15285am	15665am	
2000	2100	USA, WINB Red Lion PA	13570am	
2000	2100	USA, WMLK Bethel PA	9265eu	15265eu
2000	2100	USA, WRMI Miami FL	9955am	
2000	2100	USA, WTJC Newport NC	9370na	
2000	2100	USA, WWCR Nashville TN	9975na	9985na
		12160na	13845na	15825na
2000	2100	USA, WWRB Manchester TN	9385na	11915na
		15250na		
2000	2100	USA, WYFR Okeechobee FL	3230af	6020af
		7360va	13800am	15195af
		17750va	17795am	17725va
2000	2100	Zambia, Christian Voice	4965af	17845af
2000	2100	Zimbabwe, ZBC Corp	5975do	18980va
2000	2130	China, China Radio Intl	11640af	
2005	2100	Syria, Radio Damascus	9330eu	13630af
		13610af		12085eu
2020	2045	Vatican City, Vatican Radio	6185eu	
2025	2045	Italy, RAI Intl	5985af	
2030	2045	Libya, Voice of Africa		11635af
2030	2045	Thailand, Radio	9535eu	
2030	2100	Belarus, Radio	7125eu	7340eu
2030	2100	Cuba, Radio Havana		7440eu
2030	2100	Egypt, Radio Cairo	15375af	9505va
2030	2100	Sweden, Radio	6065va	11760va
2030	2100	USA, Voice of America	4940af	
		7595as	11975af	6035af
		15580af		13710af
2030	2100	USA, Voice of America	4930af	15240af
2030	2100	Uzbekistan, Radio Tashkent	7185as	
2045	2100	India, All India Radio	7410eu	
		9910oc	9950eu	9445eu
2045	2100	Vatican City, Vatican Radio	9800na	11715oc
2050	2100	Vatican City, Vatican Radio	4005eu	5885eu
		7250eu		

2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

2100	2120	Vatican City, Vatican Radio	4005eu	5885eu
		7250eu		
2100	2127	Czech Rep, Radio Prague Intl	5930va	9430va

2100	2130	Australia, ABC NT Katherine	2485do	
2100	2130	Australia, ABC NT Tennant Creek		2325do
2100	2130	Australia, Radio	9500as	11695as
2100	2130	Canada, CBC NQ SW Service	9625na	
2100	2130	Cuba, Radio Havana	9505va	11760va
2100	2130	South Korea, KBS World Radio		3955eu
2100	2130	UK, BBC World Service	15390ca	
2100	2130	USA, Voice of America	7595as	
2100	2130	Vatican City, Vatican Radio	9800na	
2100	2145	Nigeria, Radio/Ibadan	6050do	
2100	2159	Canada, Radio Canada Intl	5850eu	9770eu
		15180am		
2100	2200	Anguilla, Caribbean Beacon	11775am	
2100	2200	Australia, ABC NT Alice Springs		2310do
		4835irr		
2100	2200	Australia, Radio	9660pa	7240pa
		11660pa	12080pa	13630pa
2100	2200	Austria, AWR Europe	9830af	15515pa
2100	2200	Canada, CFRX Toronto ON	6070do	
2100	2200	Canada, CFPV Calgary AB	6030do	
2100	2200	Canada, CKZN St John's NF	6160do	
2100	2200	Canada, CKZU Vancouver BC	6160do	
2100	2200	China, China Radio Intl	5960eu	7285eu
		9490eu	9600eu	
2100	2200	Costa Rica, University Network	13750va	
2100	2200	Egypt, Radio Cairo	15375af	
2100	2200	Eqt Guinea, Radio Africa	15190af	
2100	2200	Germany, Deutsche Welle	7280af	9615af
		11690af		
2100	2200	Ghana, Ghana BC Corp	3366do	4915do
2100	2200	Guyana, Voice of	3291do	5950do
2100	2200	India, All India Radio	7410eu	9445eu
		9910oc	9950eu	11620va
2100	2200	Italy, IRRS	5775va	11715oc
2100	2200	Japan, Radio Japan/NHK World		6035oc
		6090eu	6180eu	11855va
		21670pa		17825na
2100	2200	Liberia, ELWA	4760do	
2100	2200	Liberia, Star Radio	11960af	
2100	2200	Malaysia, RTM/Trax FM	7295as	
2100	2200	Namibia, Namibian BC Corp	3270do	3290do
		6060do	6175do	
2100	2200	New Zealand, Radio NZ Intl	15720pa	
2100	2200	New Zealand, Radio NZ Intl	13595pa	
2100	2200	Nigeria, Radio/Kaduna	4770do	6090do
2100	2200	Nigeria, Radio/Lagos	3326do	4990do
2100	2200	North Korea, Voice of	7570eu	12015eu
2100	2200	Papua New Guinea, Catholic Radio		4960do
2100	2200	Papua New Guinea, NBC	4890do	
2100	2200	Papua New Guinea, Wantok R.Light		7120va
2100	2200	Russia, Voice of	5820eu	
2100	2200	Russia, Voice of	7330eu	15735ca
2100	2200	Rwanda, Radio	6055do	
2100	2200	Sierra Leone, SLBS 3316do		
2100	2200	South Africa, Channel Africa	3345af	
2100	2200	Syria, Radio Damascus	9330eu	12085eu
		13610af		
2100	2200	UK, BBC World Service	3255af	3915as
		5965as	6005af	6110af
		6195eu	9410eu	9605af
		15400af		11675ca
2100	2200	USA, AFRTS	4156usb	4319usb
		5765usb	7590usb	7812usb
		12579usb	12133usb	12579usb
		13855usb		13362usb
2100	2200	USA, KAIJ Dallas TX	13815na	
2100	2200	USA, KTBN Salt Lake City UT	15590na	
2100	2200	USA, Voice of America	6035af	11975af
		15240af	15580af	
2100	2200	USA, WBCQ Kennebunk ME	7415na	9330na
		18910na		
2100	2200	USA, WBOH Newport NC	5920am	
2100	2200	USA, WEWN Birmingham AL	11645va	13615va
		15745va	15785va	
2100	2200	USA, WHRA Greenbush ME	11530na	15665na
2100	2200	USA, WHRI Noblesville IN	7315am	9840am
		11885am	15665am	
2100	2200	USA, WINB Red Lion PA	13570am	
2100	2200	USA, WMLK Bethel PA	9265eu	15265eu
2100	2200	USA, WRMI Miami FL	9955am	
2100	2200	USA, WTJC Newport NC	9370na	
2100	2200	USA, WWCR Nashville TN	9975na	9985na
		12160na	13845na	15825na
2100	2200	USA, WWRB Manchester TN	9385na	11915na
		15250na		
2100	2200	USA, WYFR Okeechobee FL	7260va	11565va
		11655af	13800am	15195af
		17795va	17845va	17725af
2100	2200	Zambia, Christian Voice	4965af	18980va
2100	2200	Zimbabwe, ZBC Corp	5975do	
2115	2130	Libya, Voice of Africa		11635af
2115	2200	Egypt, Radio Cairo	9990eu	
2115	2200	USA, WYFR Okeechobee FL	11875af	
2130	2156	Romania, Radio Romania Intl	7145eu	9650eu
		9755na	11940na	
2130	2200	Australia, ABC NT Katherine	5025do	
2130	2200	Australia, ABC NT Tennant Creek		4910do

2130	2200	mtwhfa	Canada, CBC NQ SW Service	9625na	
2130	2200		Guam, AWR/KSDA 11960as		
2130	2200	drm	Netherlands, Radio 9800na		
2130	2200		Turkey, Voice of 9525va		
2130	2230	t f	UK, BBC World Service	11680ca	
2130	2200		USA, Voice of America	6235as	7405as
2130	2200		Uzbekistan, Radio Tashkent	7185as	

2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

2200	2210		Syria, Radio Damascus	9330eu	12085eu
2200	2228		Hungary, Radio Budapest	6025eu	9735eu
2200	2229		Canada, Radio Canada Intl	11990sa	
2200	2230	s	Belarus, Radio 7125eu	7340eu	7440eu
2200	2230		India, All India Radio	7410eu	9445eu
			9910oc	9950eu	11620va
2200	2230		Papua New Guinea, NBC	9675do	
2200	2230		Turkey, Voice of 9525va		
2200	2235	drm test	New Zealand, Radio NZ Intl	15720pa	
2200	2235		New Zealand, Radio NZ Intl	13595pa	
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2257		Czech Rep, Radio Prague Intl	5930na	7345af
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs		2310do
			4835irr		
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek		4910do
2200	2300		Australia, Radio 12010va	13620as	13630pa
			15230pa	15240as	15515pa
			17795pa		
2200	2300		Bulgaria, Radio 5800eu	7500eu	
2200	2300	smtwhf	Canada, CBC NQ SW Service	9625na	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300	drm	Canada, Radio Canada Intl	9800na	
2200	2300		China, China Radio Intl	7170eu	
2200	2300		Costa Rica, University Network	13750va	
2200	2300		Eqt Guinea, Radio Africa	15190af	
2200	2300		Germany, Deutsche Welle	6000as	6225as
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3291do		
2200	2300	mtwhf	Italy, IRRS 5775va		
2200	2300	vl	Malaysia, RTM/Trax FM	7295as	
			Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos	3326do	4990do
2200	2300		Papua New Guinea, Catholic Radio		4960do
2200	2300	vl	Papua New Guinea, Wantok R.Light		7120va
2200	2300	irreg/ vl	Sierra Leone, SLBS 3316do		
2200	2300		Solomon Islands, SIBC	5020do	9545do
2200	2300	as	Spain, Radio Exterior Espana	6125eu	9595af
2200	2300		Taiwan, Radio Taiwan Intl	6080as	
2200	2300		UK, BBC World Service	5955as	5965as
			5975as	5990as	6195as
			9740as	15400af	9605af
2200	2300		Ukraine, Radio Ukraine Intl	5840eu	
2200	2300		USA, AFRTS 4156usb	4319usb	5765usb
			5765usb	7590usb	7812usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
2200	2300		USA, KAIJ Dallas TX	13815na	
2200	2300		USA, KTNB Salt Lake City UT	15590na	
2200	2300	mtwhf	USA, Voice of America	7120va	
2200	2300		USA, Voice of America	6235as	15185va
			15290va	17740va	
2200	2300		USA, WBCQ Kennebunk ME	5110na	7415na
			9330na	18910na	
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	7560va	9975va
			11645va	15745va	
2200	2300		USA, WHRA Greenbush ME	5850na	6195na
			15665na		
2200	2300		USA, WHRI Noblesville IN	7315am	7490am
			11885am	15665am	
2200	2300		USA, WINB Red Lion PA	13570am	
2200	2300		USA, WRMI Miami FL	7385am	
2200	2300		USA, WRMI Miami FL	7385am	
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN	7465na	9985na
			12160na	13845na	
2200	2300		USA, WWRB Manchester TN	9385na	11915na
			15250na		
2200	2300		USA, WYFR Okeechobee FL	11740am	11875af
			15770af		
2200	2300		Zambia, Christian Voice	4965af	
2205	2230		Italy, RAI Intl	6090as	
2230	2259		Canada, Radio Canada Intl	6160as	7195as
			9730as		
2230	2300	mtwhfa	Albania, Radio Tirana	7110eu	
2230	2300	as	Australia, HCJB	15530as	
2230	2300		Guam, AWR/KSDA 11655as		
2230	2300		Sweden, Radio 6065va		

2230	2300		USA, Voice of America	7230va	13755va
2230	2300		Vatican City, Vatican Radio	5885as	
2236	2300		New Zealand, Radio NZ Intl	17675pa	
2236	2300	drm test	New Zealand, Radio NZ Intl	15720pa	
2245	2300		India, All India Radio	9705as	9950as
			11620as	11645as	13605as

2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs		2310do
			4835irr		
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek		4910do
2300	0000		Australia, Radio 9660pa	12010va	12080pa
			13620as	13630pa	13670va
			17785pa	17795pa	21740pa
2300	0000	smtwhf	Canada, CBC NQ SW Service	9625na	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		China, China Radio Intl	5915as	5990am
			6040na	7180as	11970na
2300	0000		Costa Rica, University Network	9725va	
2300	0000		Cuba, Radio Havana	9550am	
2300	0000		Egypt, Radio Cairo 11885na		
2300	0000		Germany, Deutsche Welle	6070as	9555as
			9815as		
2300	0000	drm	Germany, Deutsche Welle	9800na	
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3291do		
2300	0000		India, All India Radio	9705as	9950as
			11620as	11645as	13605as
2300	0000		Malaysia, RTM/Trax FM	7295as	
2300	0000	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
2300	0000		New Zealand, Radio NZ Intl	17675pa	
2300	0000	drm test	New Zealand, Radio NZ Intl	15720pa	
2300	0000		Papua New Guinea, Catholic Radio		4960do
2300	0000		Papua New Guinea, NBC	9675do	
2300	0000		Papua New Guinea, Wantok R.Light		7120va
2300	0000	irreg/ vl	Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vl	Solomon Islands, SIBC	5020do	9545do
2300	0000		Turkey, Voice of 5960va		
2300	0000		UK, BBC World Service	3915as	5965as
			6195as	9605as	9740as
			11955as		11945as
2300	0000		USA, AFRTS 4156usb	4319usb	5765usb
			5765usb	7590usb	7812usb
			12579usb	12133usb	12579usb
			13855usb		13362usb
2300	0000		USA, KAIJ Dallas TX	13815na	
2300	0000		USA, KTNB Salt Lake City UT	15590na	
2300	0000		USA, Voice of America	6180va	7205va
			11655va	15150va	
2300	0000	mtwhf	USA, Voice of America	7120va	
2300	0000		USA, WBCQ Kennebunk ME	5110na	7415na
			9330na		
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	7540va	7560va
			9975va	11830va	
2300	0000		USA, WHRA Greenbush ME	5850na	6195na
2300	0000		USA, WHRI Noblesville IN	7315am	7490am
			15665am		
2300	0000		USA, WINB Red Lion PA	9265am	
2300	0000	mtwhf	USA, WRMI Miami FL	7385am	
2300	0000	as	USA, WRMI Miami FL	9955am	
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000		USA, WWCR Nashville TN	5070na	7465na
			9985na	13845na	
2300	0000		USA, WWRB Manchester TN	3270na	
2300	0000		USA, WYFR Okeechobee FL	11740am	15255va
			17750va		
2300	2315		Nigeria, Radio/Kaduna	4770do	6090do
2300	2315		Nigeria, Radio/Lagos	3326do	
2300	2315		USA, WYFR Okeechobee FL	11875af	
2300	2329		Canada, Radio Canada Intl	6160as	7195as
			9730as		
2300	2330		Australia, Radio 15240as		
2300	2356		Romania, Radio Romania Intl	7105eu	9610na
			9640eu	11730na	
2300	2359		Canada, Radio Canada Intl	6100am	
2315	2330	vl	Croatia, Croatian Radio	7285va	
2330	0000		Australia, Radio 15415as	17750as	
2330	0000		Burma, Dem Voice of Burma	5955eu	
2330	0000		Lithuania, Radio Vilnius	7325na	
2330	0000		UK, BBC World Service	3915as	5965as
			6035as	6170as	9605as
			9740as	11945as	11955as
2330	0000		USA, Voice of America	6180va	7205va
			11655va	13640va	15150va
2330	2357		Czech Rep, Radio Prague Intl	5930na	7345af
2335	0000	sm	Austria, Radio Austria Intl	9870sa	
2345	2358	twhfa	Austria, Radio Austria Intl	9870sa	

"I don't live near a military base..."

There is a common lament I see from time to time posted on various military internet newsgroups, and it goes like this: "I don't live near a military base, so I can't hear any military air communications."

Well, as our regular *Milcom* reporter, Jack NeSmith shows us this month, you do not have to live near a base to monitor military air comms. Jack lives in north central Florida and is not near any military bases, but he has dialed in the right frequencies for his area and has intercepted quite a bit of activity from the southern tip of Florida northward into several neighboring states. This month we feature a list of his frequencies recently monitored from his listening post.

North-Central Florida Logs

225.150 JStars aircraft discrete
225.350 Pinecastle Range target impact (FL)
225.750 Eglin AFB (FL) 919SOW Command Post "Sandcastle Ops"
225.800 Eglin AFB (FL) Air Combat Command Training Exercises [I show this as an active NORAD discrete in the SE US]
228.050 JStars/AWACS aircraft discrete
228.400 Townsend Bombing Range Control (R-3007) (GA)
228.500 USAF Unknown user [I show Jstars Operations here in the past]
231.750 JStars aircraft discrete
233.500 Tyndall AFB (FL) Air Combat Maneuvering (ACM)
233.700 Moody AFB (GA) Approach Control
234.700 NORAD
234.800 Jacksonville International Airport (FL) 125FW/159FS Air-to-Air
234.925 Tyndall AFB (FL) ACM
235.100 JStars aircraft discrete [My notes show this is a nationwide aerial refueling discrete for established tracks]
235.200 ECM Air to Ground (Tentative) [Pretty much a nationwide assignment]
236.250 St. Augustine (FL) Grumman "Echo Base"
237.000 Tyndall AFB (FL) ACM
237.150 AWACS Voice Coordination/JStars Inter-flight (nationwide)
237.700 Eglin AFB (FL) Unknown user/Air-to-Air
238.900 Aerial Refueling Anchor AR-620 <Primary>
239.550 Eglin AFB (FL) 33FW Air-to-Air
241.000 Florida National Guard
246.800 Ft. Stewart (GA) 3-7 Cav Air-Ground/Air-to-Air
247.000 Ft. Stewart (GA) Flight Following Advisories
249.600 Unknown user/usage
251.250 Jacksonville International Airport (FL) 125FW/159FS Command Post/Pilot-to-Maintenance Dispatchers/Air-Air
252.000 NORAD
253.700 Jacksonville International Airport (FL) 125FW/159FS Air-to-Air
254.200 NORAD
254.250 Jacksonville ARTCC Remote Communications Air/Ground (RCAG) Avon Park (FL)
254.325 Jacksonville ARTCC RCAG Lake City (FL)
255.500 Patrick AFB (FL) 920 RQS Rescue Operations
256.600 NORAD (North American Aerospace

Defense Command)
256.875 Miami ARTCC RCAG Avon Park (FL)
257.500 Tyndall AFB (FL) W-470A Common
257.550 Eglin AFB (FL) Air-to-Air
257.700 Miami ARTCC RCAG Avon Park (FL)
261.000 Tyndall AFB (FL) W-470 Ground Control Intercept Operations
261.200 Eglin AFB (FL) Air-to-Air
261.250 Pinecastle Range R-2907A/B Range Lake George Targets (FL)
262.000 Tyndall AFB (FL) Air-to-Air
263.050 Jacksonville ARTCC RCAG Jacksonville (FL)
263.200 NORAD
263.500 Cecil Field (FL) CNATRA Base (Deployed units) [I also show NAS Jacksonville]
264.325 Unknown user/usage USN (Tentative)
264.400 NORAD
264.500 MCAS Beaufort (SC) Metro (weather briefings)
264.625 Avon Park Bomb Range (FL) Operations (Bravo Range)
265.400 NORAD
267.500 FACSAC Jacksonville Warning Area Air/Ground Advisory "Sealord"
269.250 Miami ARTCC RCAG Orlando (FL)
269.300 Miami ARTCC RCAG Melbourne (FL)
269.325 Jacksonville (FL) Approach/Departure Control (Gainesville area)
270.400 NORAD
270.600 FACSAC Jacksonville Ground Controlled Intercept (GCI) "Bristol"
271.400 NAS Jacksonville (FL) Sea Control Wing Atlantic Common VS-22 "Vidar Base"
273.525 Jacksonville ARTCC unknown RCAG paired with 135.050
273.550 Jacksonville ARTCC RCAG Daytona (FL)
273.700 NAS Jacksonville Unknown usage (FL)
273.900 Jacksonville International Airport (FL) 125FW/159FS Supervisor of Flying (SOF)
274.100 Unknown user/usage USN (Tentative) [Have seen both CVW-7 and CVW-3 Wing Air-to-Air here]
276.550 Eglin AFB (FL) Air-to-Air
277.400 Jacksonville ARTCC RCAG Brunswick (GA) paired with 126.750
277.600 NORAD
278.000 Tyndall AFB (FL) Air-to-Air
278.400 NORAD
279.450 VT-7/TAW-1 (T-45 aircraft) Air-to-Air based at NAS Kingsville (TX)
279.600 Tampa Approach/Departure Control (FL)
281.425 Daytona Approach/Departure Control (FL)
282.200 Jacksonville ARTCC RCAG Brunswick (GA) paired with 124.675
282.300 Jacksonville ARTCC RCAG Alma (GA) paired with 135.975
282.600 NORAD
283.400 Beaufort MCAS (Merritt Field) (SC) VMFA (AW)-224 Air-to-Air
284.100 Eglin AFB (FL) Range Control/Operations
284.500 FACSAC Jacksonville Warning Area Air/Ground Advisory "Sealord"
285.000 NAS Jacksonville (FL) Tactical Support Center (TSC) "Fiddle"
285.500 Miami ARTCC RCAG Avon Park (FL)
285.650 Jacksonville ARTCC RCAG Savannah (GA) paired with 126.125
285.725 Avon Park (FL) Range Control/Operations - Charlie/Echo Ranges
289.200 Pinecastle Range (FL) Air Control "Sealord"
290.225 Jacksonville ARTCC Unknown RCAG
290.300 Tampa Approach/Departure Control (FL)

290.350 Jacksonville ARTCC RCAG Savannah (GA)
290.400 Jacksonville ARTCC RCAG Alma (GA)
290.800 Tyndall AFB (FL) Ground Controlled Approach (GCA) [The only thing I show is an Atlanta ARTCC Discrete out of Jasper GA]
292.200 Avon Park (FL) Range Control/Operations - Range Target Scoring
293.225 Miami ARTCC Unknown RCAG
293.550 AWACS (Tentative) [I show this as a JStars discrete]
296.650 Jacksonville International Airport (FL) 125FW/159FS ACM [I show that this is an AWACS Voice Coordination]
298.500 NORAD
299.000 Tyndall AFB (FL) Air-to-Air
299.500 Eglin AFB (FL) 33FW Air-to-Air
300.500 Mayport Naval Station (FL) LAMPS Helo Common
300.525 Seymour Johnson AFB (NC) 4FW/333FS Air-to-Air
300.625 Seymour Johnson AFB (NC) 4FW/333FS Air-to-Air
300.825 Seymour Johnson AFB (NC) 4FW/334FS Air-to-Air
301.125 Unknown user/usage USN last reportedly used by USS Enterprise
303.000 MacDill AFB (FL) 6ARW Command Post
306.300 Jacksonville ARTCC RCAG Florence (SC)
306.900 Miami ARTCC RCAG Key West (FL)
307.000 Orlando Approach/Departure Control (FL)
307.100 Miami ARTCC RCAG Pahokee (FL)
307.250 Jacksonville ARTCC RCAG St. Augustine (FL) paired with 126.350
308.750 Unknown user/usage [I show this as a JStars aircraft discrete]
310.200 NAS Jacksonville (FL) Base Operations
310.825 Moody AFB (GA) GCA
314.050 Tyndall AFB (FL) Ground Control Intercept Operations "Whetstone Control"
314.200 Jacksonville International Airport (FL) 125FW/159FS Air-to-Air
314.300 Eglin AFB (FL) 53TEG/85T&ES Air-to-Air
314.450 USAF Unknown usage (Tentative) [I show this as a JStars discrete]
316.300 NORAD
317.525 Jacksonville ARTCC Unknown RCAG
317.600 Jacksonville ARTCC RCAG Lowell (FL) paired with 135.750
317.950 Eglin AFB (FL) Air-to-Air
319.000 Miami ARTCC RCAG Vero Beach (FL)
320.500 FACSAC Jacksonville Ground Controlled Intercept (GCI) "Bristol"
320.600 Jacksonville International Airport (FL) 125FW/159FS Air-to-Air [I show this as a NORAD SE SOCC ACM tactical]
321.000 MacDill AFB (FL) 6ARW Command Post
322.425 Jacksonville ARTCC RCAG Lake City (FL)
322.475 FAA Unknown usage
322.500 Jacksonville ARTCC RCAG Savannah (GA)
323.050 Jacksonville ARTCC RCAG Crestview (FL)
323.125 Ft Stewart/Hunter AAF (GA) ATIS
323.200 Miami ARTCC RCAG Brooksville (FL)
324.650 AWACS (Tentative) [AWACS Voice Coordination and JStars discrete]
325.400 NAS Jacksonville (FL) VS-22 Squadron Common "Vidar"
325.600 USSTRATCOM AAR Random Tracks [Also AWACS Interplane]
327.100 Jacksonville ARTCC RCAG Jacksonville (FL) paired with 134.850
327.600 Aerial Refueling [AR-202 (South/North/Alt North)]
335.950 USAF ACC Common Exercise Frequency/



F-22 Raptor from Tyndall AFB (DoD photo)

	AWACS
338.350	Tyndall AFB (FL) Approach/Departure Control
339.500	Beaufort MCAS (Merritt Field) (SC) VMFA-115/CVW-3 Air-to-Air
341.100	FACSFAC Jacksonville Discrete – GCI/ACM “Sealord”
342.100	Eglin AFB (FL) Range Control/Operations “Mission Control”
343.000	Jacksonville International Airport (FL) 125FW/159FS Air-to-Air
343.500	USSTRATCOM Aerial Refueling
345.000	USCG Air Operations nationwide <Primary>
346.250	Jacksonville ARTCC RCAG St. Augustine (FL) paired with 127.450
346.300	Jacksonville ARTCC RCAG Alma (GA)
348.700	Miami ARTCC RCAG Melbourne (FL)
349.000	Miami ARTCC RCAG Avon Park (FL)
349.900	NAS Jacksonville (Tentative) [My records show this is a FACSFAC Jacksonville Warning Area Air/Ground Advisory]
350.000	Beaufort MCAS (Merritt Field) (SC) TACTS South Range (4x)
351.900	Orlando Approach/Departure Control (FL)
352.000	Jacksonville ARTCC RCAG Perry Foley (FL) paired with 127.800
353.500	Jacksonville ARTCC Current IFR shows Dothan (AL) paired with 134.300. [On our new list looks like it is now Ashburn, GA]
357.000	Pinecastle Range R-2910 Range Control/Operations (FL)
360.700	Jacksonville ARTCC RCAG Lowell (FL)
360.800	Jacksonville ARTCC RCAG Geneva (AL) paired with 125.050
364.200	NORAD Air Intercept Control Common (AICC) nationwide
371.350	NAS Jacksonville VP-5 Squadron Common “Fox Den”
376.125	AWACS/JStars discrete
376.900	FACSFAC Jacksonville – W-157 Discrete
377.050	Jacksonville Approach/Departure Control (FL)
379.200	Jacksonville ARTCC RCAG Valdosta (GA) paired with 125.950
379.250	Miami ARTCC RCAG Melbourne (FL)
380.250	Lakeland Linder Regional Tower (FL)
380.300	Miami ARTCC RCAG Sarasota (FL)
381.000	JStars aircraft discrete
382.600	Flight Test Support (nationwide)
383.000	Patrick AFB Consolidated Command Post (FL)
385.300	FACSFAC Jacksonville – W-157 Discrete “Sealord”
385.600	Jacksonville ARTCC RCAG Gainesville (FL)
393.800	Jacksonville International Airport (FL) 125FW/159FS Air-to-Air
395.150	JStars aircraft discrete

Thanks, Jack, for the fine update from your area. I hope a few more of our readers will be inspired to take a bit of their time to update us on what they are hearing in their portion of the *Milcom* world.

FAA ARTCC Frequency List

In this month's FAA Air Route Traffic Control Center report we are going to take a look at the Albuquerque Center in Table One.

For the background on the Air Route Traffic Control Centers, check out our *Milcom* column in the June 2005 issue of *MT*.

So, until next month, 73 and good hunting.

Table One: Albuquerque ARTCC Frequency List

ALBUQUERQUE ARTCC

Alamogordo, NM	
132.650/257.600	Low/High Discrete
Albuquerque, NM	
121.500/243.000	Low/High: Civilian/Military Emergency
132.800/346.350	Low Discrete
134.600/287.900	High Discrete
Amarillo No. 1, TX	
127.850/351.700	Low Discrete: Approach/Departure Services
Amarillo No. 2, TX	
134.750/239.250	High
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
Animas, NM	
133.000/281.500	High
133.725/341.700	Ultra High Discrete
134.450/327.150	Low Discrete: Approach/Departure Services
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
Carlsbad, NM	
135.875/292.150	Low Discrete: Approach/Departure Services
Childs Peak, AZ	
125.250/307.300	Low Discrete
126.450/288.300	Low
132.450/371.900	Ultra High
135.150/350.200	High
Clines Corner, NM	
118.650/269.475	Low
132.800/346.350	Low Discrete
133.650/284.600	High
El Paso Site A, TX	
134.175/278.300	High
135.875/292.150	Low Discrete: Approach/Departure Services
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
El Paso Site B, TX	
125.525/269.450	High
128.200/285.500	Low Discrete: Approach/Departure Services
Fort Stockton, TX	
120.925/278.300	High
132.200/274.600	Ultra High
135.875/292.150	Low Discrete: Approach/Departure Services
243.000	Low/High: Military Emergency
Globe No. 1, AZ	
132.900/239.050	Low Discrete: Approach/Departure Services
135.725/339.800	High
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
338.300	Low: Special Military Use

Globe No. 2, AZ	
125.400/269.300	Low Discrete: Approach/Departure Services
132.350/353.900	Low/High
133.850/290.300	Low
135.150/350.200	High
260.600	Low: Special Military Use
Guadalupe, TX	
133.225/270.350	Ultra High
Humboldt Mountain, AZ	
267.900	Low/High: Special Military Use
Mesa Rica, NM	
119.450/385.650	Ultra High
128.675/360.800	Ultra High Discrete
Mount Dora, NM	
127.850/351.700	Low Discrete: Approach/Departure Services
128.225/291.600	Ultra High
133.050/269.350	High
Prescott, AZ	
128.450/298.900	Low Discrete: Approach/Departure Services
134.325/312.000	High
135.525/370.900	Ultra High
Raton, NM	
132.800/346.350	Low Discrete: Approach/Departure Services
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
Roswell, NM	
132.650/257.600	Low Discrete: Approach/Departure Services
256.700	High: MOA Beak ATC
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
259.200 353.600	Low/High
Sandia Mountain, NM	
132.800/346.350	Low Discrete: Approach/Departure Services
Silver City, NM	
134.450/327.150	Low Discrete: Approach/Departure Services
243.000	Low/High: Military Emergency
Tesuque Peak, NM	
132.800/346.350	Low Discrete: Approach/Departure Services
Truth or Consequences, NM	
128.200/285.500	Low Discrete: Approach/Departure Services
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
Tucson, AZ	
133.000/281.500	High
134.450/327.150	Low Discrete: Approach/Departure Services
273.600	Low/High
398.900	Low: Special Military Use
Tucumcari, NM	
126.850/285.600	Low Discrete: Approach/Departure Services
133.500	High
135.700	High
251.100	High
267.900	Low: Special Military Use
353.550	High
West Mesa, NM	
119.450/385.650	Ultra High
124.325/288.250	Low Discrete: Approach/Departure Services
133.650/284.600	High
Winslow, AZ	
124.500/306.200	Low Discrete: Approach/Departure Services
132.900/312.000	High
Zuni, NM	
120.550/285.400	High
124.325/288.250	Low Discrete: Approach/Departure Services
132.900/312.000	High
134.600/251.150	Ultra High
321.300	High: Tactical Support Use Frequency (FL450 and above) (Amber 6)
Additional frequencies monitored (RCAG unknown)	
119.625/317.750	125.075/279.500 126.225
	132.125/307.050 132.325
	133.925/282.350 385.600

State-by-State across the Midwest

We're headed back east this month. The ground conductivity in the Western Plains is sky-high; stations around here have fantastic groundwave coverage. Unfortunately, groundwave doesn't do the DXer much good.

North Dakota:

North Dakota is home of wide open spaces – but not a whole lot of radio stations. Two Fargo stations are probably the DXer's best bet: KFNW-1200 is a religious station running 10,000 watts non-directional during the day (with a permit to increase to 50,000 while going directional). This station is frequent reception in Wisconsin at sunrise, and has been heard here in Tennessee as well. Fargo is also home to the state's expanded-band station, nostalgia-formatted KQWB-1660.

KFYR-550 is said to have the best daytime signal coverage of any U.S. station. Having traveled extensively in North Dakota I certainly concur! Day and night, KFYR is easy car radio reception statewide. Too bad that coverage doesn't extend so far outside the state... but KFYR is still a good target for the DXer. Newer station KXMR-710 also has statewide daytime coverage, and is worth a try.

South Dakota:

Another station with extensive daytime coverage is WNAX, in Tom Brokaw's hometown of Yankton. Unfortunately, like North Dakota's KFYR, WNAX's nighttime pattern doesn't favor the east – and like KFYR's 550, WNAX's 570 frequency is pretty crowded. A number of other stations, however, make South

Dakota a much easier catch than its northern neighbor.

KSOO-1140, Sioux Falls, is probably your best bet. Listen around sunset, before they go on their nighttime antenna pattern. Also frequently heard here in Tennessee is KOKK-1210, Huron. Like KSOO, they're a sunrise/sunset target. KWYR-1260, Winner, is another commonly-reported South Dakota station – they shouldn't be audible in the East at night, but sometimes propagation permits strange things...

The databases suggest three more South Dakota stations should be good DX targets: KBHB-810, Sturgis (25,000 watts daytime); KGFX-1060, Pierre (10,000 watts); and KKAA-1560, Aberdeen. (10,000) However, none of these is frequently reported. Still, one should never give up on a frequency; again, strange things do happen!

Nebraska:

Thanks to two 50,000-watt stations and an expanded-band outlet, Nebraska is the easiest of the states we'll cover this month. For Eastern DXers, Omaha's KFAB-1110 is probably the easiest shot. KFAB protects WBT, Charlotte, but is allowed to remain non-directional until Omaha sunset. KFAB is an easy catch in the East from the time WBT goes directional (at Charlotte sunset) until sunset in Omaha. In the West, KFAB should be easy all night, as long as you don't have a nearby station on 1110.

Another good Cornhusker target is KRVN-880, Lexington. Like KFAB, KRVN is non-directional during the day (and thus an easy catch around sunrise and sunset), and directional favoring the West at night (protecting WCBS, New York City). KRVN's owners are a cooperative of Nebraska farmers and ranchers, so the programming is heavy on agricultural information. Nebraska's expanded-band station is KOZN-1620, ESPN Radio in the Omaha suburb of Bellevue. Another Omaha station heard frequently to the east is another sports outlet, KXSP-590.

Best Bets for Logging the Western Plains:

Kansas:	KLOE-730, KXXX-790, KXTR-1660
Nebraska:	KRVN-880, KFAB-1110
North Dakota:	KFNW-1200, KQWB-1660
South Dakota:	KSOO-1140, KOKK-1210, KWYR-1260
Wyoming:	KTWO-1030, KRND-1630

Kansas:

The Sunflower State is another sunrise/sunset target. The few stations on clear-channel frequencies here generally have antenna patterns that don't favor the East, or run very low power at night. KLOE-730, Goodland, is a worthwhile sunrise/sunset target, as is KBUF-1030, Garden City. Two regional-channel stations are frequently DXed: KSAL-1150, Salina and KXXX-790, Colby.

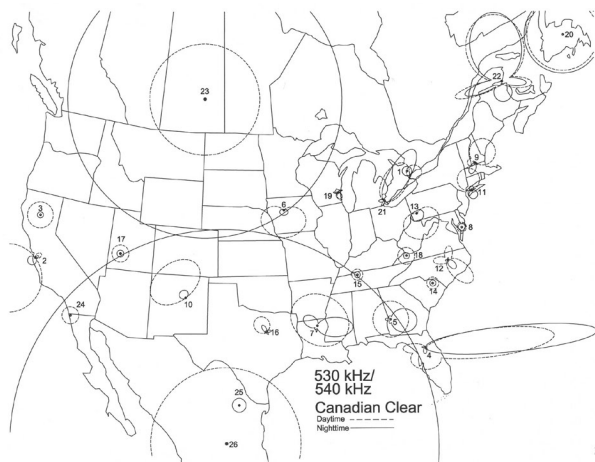
Luckily for the DXer, when Topeka's WREN-1250 decided to move to Kansas City, they chose the Kansas KC, instead of the much larger Missouri city of the same name. WREN simultaneously moved to 1660 in the expanded band, (and changed calls to KXTR), becoming most DXers' best shot at a Kansas logging. KXTR's classical music format definitely stands out on the AM dial!

Wyoming:

The DXer needing Wyoming has certainly benefited from the expanded band. Unfortunately, you'll need at least a passing familiarity with Spanish to take advantage of it. Cheyenne's KRND-1630 is by far your best bet at the Cowboy State. The only other Wyoming station heard in the East recently is 50,000-watt KTWO-1030, Casper. You know the refrain: try at sunrise and sunset... KHAT-1210, Laramie, should be reported more often than it is.

❖ DX Destination

Patrick Griffith recently had opportunity to visit the Dawson County Historical Museum in Lexington, Nebraska, home of KRVN-880. The Museum's collection includes some of KRVN's old studio gear, from before they moved to the 880 dial position. (KRVN originally operated on 1010 kHz, until a change in FCC regulations in the 1960s allowed them to change frequency and increase power.) You can see photos from Patrick's visit on <http://community.webtv.net/N0NNK/>



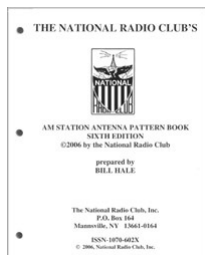
The NRC's new Pattern Book shows directional antenna patterns for all AM frequencies, including this page for 540 kHz.

❖ New Pattern Book

When trying to determine whether a particular AM station will be audible at your location, the station's power is only half the equation. Most AM stations use directional antennas at night. If KTWO-1030 were non-directional at night, it would be an easy catch in the East – and Wyoming would be one of the easiest Western states to log. Most station listings, both on the Web and in print, don't show the stations' directional patterns.

The National Radio Club has just released a new *AM Station Antenna Pattern Book*. This valuable reference shows the directional patterns of all U.S. and Canadian AM stations. It also serves as a handy map of DX targets on any given frequency. Increasingly, AM stations are using directional antennas during the day as well as at night; this is the first edition of the *Pattern Book* to feature daytime patterns as well as night.

A quick look at the 1430 kHz page promptly explains why Indianapolis' WXNT is the dominant nighttime signal here on that frequency, even though WPLN on the same frequency is 200 miles closer. The page for 1000 kHz shows why WMVP, Chicago, is rarely heard in the West, despite their 50,000-watt transmitter. See www.nrcdxas.org/catalog/books/ to order.



❖ URBONO QSLs

The International Radio Club of America (IRCA) has volunteered to handle QSLs for the special hurricane relief network established in Katrina's aftermath. Listeners who heard any of the United Radio Broadcasters of New Orleans stations between September 2nd and November 4th of last year may write for special QSLs.

Send your report – date, time, frequency, and as much program detail as possible – along with a 39-cent stamp for each station heard – to “URBONO QSL”, P.O. Box 3777, Memphis, TN 38173-0777.

URBONO AM Stations:

WWL-870
WYLD-940
WJBO-1150
WSKR-1210
WODT-1280
KJEF-1290
WSMB-1350
WYNK-1380
KLCL-1470
WHRI-shortwave and nine New Orleans and Baton Rouge FM stations were also involved.

❖ HD Radios Becoming Available

IBOC/HD digital radio continues to see a lot of support from the major broadcast groups – and not much from receiver manufacturers. At deadline, www.ibiquity.com lists a grand total of eight models of HD radio available to the consumer. Six of the eight are car radios, selling for prices between \$300 and \$800. Two are tuners only, which require a compatible analog radio from the same manufacturer be installed. The only manufacturer offering HD Radio as a factory-installed option is BMW.

Two models of home HD receiver are available. The Boston Acoustics Receptor Radio sells for just under \$500. And Yamaha (www.yamaha.com/yec/products/receivers/RXV4600.htm) has just released a home stereo receiver with HD radio – at a list price of \$1,900. (DXers have reported it available mail-order for about \$1,300 – still a lot of money for a radio!) A more reasonably-priced solution is the Radiosophy (www.radiosophy.com/products.html) \$269 receiver. Unfortunately, their website indicates they've been having production problems and this radio is not yet shipping.



New HD FM stations are appearing on the air frequently in a number of markets. I hear of the occasional new HD AM station as well, but they're few and far between. Stations are required to notify the FCC before beginning HD operation: Links to the lists of AM and FM stations that have notified are on www.fcc.gov/mb/audio/digital/. As of deadline, 110 AM stations have registered, and 516 FM stations. Not all of them have actually begun HD operation.

❖ Programming Change, or Not?

Listeners near Washington, DC, might have noticed a few changes at 1500 on the AM dial – or maybe not? Around the beginning of the year, Washington's longtime all-news station WTOP left its 1500 AM and 107.7 FM frequencies in favor of 103.5 FM. The 103.5 transmitter is in Washington (107.7 transmitted from west of the city in Virginia) and offers improved coverage.

In turn, the 1500 AM and 107.7 FM frequencies, along with 820 AM in the Frederick, Maryland, area, have become “Washington Post Radio.” The newspaper will provide news and commentary for a similar, but different, format. The new call letters WTWP have been reported.

103.5 FM was the former home of classical-music station WGMS. The classical music will continue on WWVZ 103.9 and WWZZ 104.1; I suppose one of these stations will take over the WGMS call letters.

❖ Fighting a Format Change

A recent format change in Las Vegas has many listeners upset. KJUL 104.3 had carried a mix of easy-listening and middle-of-the-road vocal music – Frank Sinatra, Dean Martin, etc.. In December of last year, that all ended. KJUL became KCYE, “Coyote Country.” The old KJUL call letters and music ended up 400 kHz up the dial, on a 104.7 station northwest of Vegas. George Appleton writes that the new KJUL isn't quite up to the standard of the old station, and their remote transmitter site results in spotty reception.

Las Vegas resident Judi Booe is one of those unhappy with the changes. She's forwarded to FCC Chair Kevin Martin a petition with nearly 900 signatures protesting the actions of Beasley Broadcasting, owners of the original KJUL. I'm afraid Ms. Booe will be disappointed.

The FCC is out of the programming business. As their Media Bureau website (www.fcc.gov/mb) says, they neither regulate, nor track, what kind of music stations play. As long as Coyote Country's country music doesn't involve indecent lyrics, the FCC will have no say in their format.

Obviously, this policy has led to serious disappointment. It certainly doesn't appear to be in the “public interest” to allow the closure of a city's only easy-listening (or classical, or oldies, ...) station in favor of a third country, or top-40, or religious format. On the other hand, could regulation actually prove counter-productive? Would you, as a station owner, consider switching an underperforming country station to easy-listening, if you knew that, should the easy-listening format fail, you would be prohibited from switching to a profitable format?

❖ 'Till next month

Have you splurged on a HD radio? How's it working? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Also stop by and visit the w9wi.com website for more on AM and FM/TV DXing. Good DX!

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Gales, Groundhogs and Great DX

“This is Fundy Coast Guard Radio to the vessel transmitting distress on 2182.”

As this column is being prepared for submission, Groundhog Day has just passed and the furry rodents have predicted an early spring. Unfortunately, the groundhog never said it would be an early start to spring. For the last two days, we have had Gale Warnings on Lake Ontario. Winds have been steady at 40 knots with higher gusts, while the waves have reached 14 feet in the middle of the Lake. The continuous Marine Broadcast from VBR Prescott Marine Radio (161.775 MHz) has been steady gale and wind warnings.

There is little VHF Great Lakes traffic, but the vessels did continue to operate into January this year. Of course, channel 16 still has the USCG stations, such as Buffalo and Alexandria Bay, as well as some distress traffic. A 406 MHz EPIRB (Emergency Position Indicating Radio Beacon) was reported active off Sodus Point, NY. Channel 82A, 157.125 MHz has traffic from the Rescue Co-ordination Centre in Trenton, Ontario, to the Search and Rescue Helicopters.

On the other hand, the HF DX has been great! With the low sunspot cycle, the lower frequencies have been alive here. The East Coast Canadian Marine stations have been

coming in well on 2182 kHz before switching to 2598 or 2749 kHz for weather broadcasts. Sydney Coast Guard Radio broadcasts at 0740, 1440, 1510, 2110, and 0040 UTC on 2749 kHz USB. Halifax Coast Guard radio can be heard at 0810, 1310, 1540, 1910, 2010 and 0110 UTC, on the same frequency. On the West Coast of Canada, 2054 kHz is used for forecasts. Tofino, British Columbia, broadcasts at 0050, 0650, 1250, and 1850 UTC, while Prince Rupert can be heard at 0105, 0705, 1305, and 1905 UTC.

5696 kHz has been very active with US Coast Guard aircraft communicating with CAMSLANT (Communication Area Master Station, Atlantic) Chesapeake, CAMSPAC (Communication Area Master Station, Pacific) Point Reyes, and other stations. I have also heard USCG Communications Station, Kodiak, Alaska, on 5696 and 8983.

Several search and rescue missions have been followed, including one that mentioned the tanker *Stolt Sun*. The vessel was found to not be in distress, but, since the Stolt tankers often visit the Great Lakes, the name piqued my interest. I am currently searching other USCG frequencies for communications (see bottom of sidebar). Reports from readers on HF frequencies would be of great help. Another group of frequencies to monitor are the international distress and hailing channels of 2182, 4125, 6215, 8291 and 12290 kHz

USB. I have heard some traffic here on those channels.

Another frequency to monitor is 6501 kHz. This is one of the frequencies for the USCG weather broadcasts. They use a computer-generated voice known as “Perfect Paul.” I have heard forecasts for both the East and West Coast on this frequency. The full schedule and frequency list has been included.

Crowley Marine tugs and their private coast station WPE, Jacksonville, Florida, have also been heard here. They use 4149 kHz USB until 0300, then switch to 8291 and 12,353 kHz for dispatch. 6224, 8297 and 16528 kHz are also listed as active frequencies.

❖ Marine Morse

As mentioned in previous articles, the Maritime Radio Historical Society has been

US Coast Guard Weather Broadcasts

NMN Chesapeake Virginia

4426, 6501, 8764, 13089, 17314 kHz USB

4/6/8 MHz 0330, 0515, 0930 UTC

6/8/13 MHz 1115, 1530, 2130, 2315 UTC

8/13/17 MHz 1715 UTC

NMG New Orleans Louisiana

4316, 8502, 12788 kHz USB
0330, 0515, 0930, 1115, 1530, 1715, 2130, 2315 UTC

NMC Point Reyes, California

4426, 8764, 13089, 17314 kHz USB

4/8/13 MHz 0430, 1030 UTC

8/13/17 MHz 1630, 2230 UTC

NOJ Kodiak Alaska

6501 kHz USB

0203, 1645 UTC

NMO Honolulu Hawaii

6501, 8764, 13089 kHz USB

6/8 MHz 0600, 1200 UTC

8/13 MHz 0005, 1800 UTC

NRV Guam

6501 kHz USB

0930, 1530 UTC

13089 kHz USB

0330, 2130 UTC

Other USCG Frequencies to monitor (USB)

4716.6, 4990, 5142.6, 5320, 5399, 8301.6, 8337.6, 10608.1 kHz



Tug James A. Hannah and barge in ice, Welland Canal late December 2005.

granted a license for station KSM in California. On January 7, I had the pleasure of hearing KSM on 6474 kHz CW. At 0100 Z, I heard the vvv vvv vvv cq cq cq de KSM and sent an email to Richard Dillman W6AWO to acknowledge the signals. KSM has recently refurbished their 16 MHz transmitter and has been testing it. They operate Saturdays and are looking for reports of their 16,914 kHz signal. They also use 12,993 and 426 kHz. I have heard the 12 MHz signal weakly but have not heard the 16 MHz signal as of yet. When they are not sending traffic on HF, they repeat their CW ID message. It is referred to as "spinning a wheel." Even if you are not great at Morse code, you can get the message they send.

This organization has done a massive restoration of the marine radio station. Their work and schedules can be seen at www.radiomarine.org.

❖ VHF Frequencies

I have received some VHF Marine listings for specific areas, and would appreciate more reports. We often get requests for frequencies for specific ports or regions. For example, Robert Gardner recently wrote and asked about frequencies in the New York City port area, which I was able to answer only in a very general way. We'll happily list the frequencies in use in your area (such as the Port of New York) if you'll report them to us. Frequency lists from local listeners who can verify active frequencies are still our most accurate source (see the lighthouse correction below), so please share what you know with other readers!

All ports use channel 16 for distress and calling, while channel 13 is used for bridge to bridge communication for commercial vessels. Eventually channel 70 will be used for digital selective calling (DSC) in all areas.

Following are a few marine channel listings we've found in web searches.

The **Port of Jacksonville, Florida**, has the following channels listed:

Crowley Marine.....	10, 18A
Moran Towing	7A
Inland Bridges.....	9
Mayport Naval Station.....	12
McAllister Towing	19A
USCG Working Channel	22A
Marine Operator	26

Halifax Nova Scotia uses the following:

Eastern Canada Towing	7A
Naval Docking	10
Port Authority	65A
Inner Harbour Traffic	12
Outer Harbour Traffic	14

East Coast traffic control stations use the following channels:

Fundy Traffic (Bay of Fundy and St. John, NB)	12, 14, 71
Canso Traffic (Strait of Canso and Chedabucto Bay)	14
Northumberland Traffic (Confederation Bridge)	12

Pleasure craft listings for the **State of Wash-**

ington include:

InterShip safety	6
USCG	22A
Pleasure Craft calling	9
InterShip (US only)	
Puget Sound	67 71 72
78A	
Pleasure Craft InterShip	68, 69 71
Secondary Marina Channel	78A
Traffic Control	
North of Lagoon Point and East of Whidbey Island	5A
South of Lagoon Point and West of Whidbey Island	14

Columbia and Willamette Rivers

Port Operations	12
Corps of Engineers	14

British Columbia

Canadian Marinas South of Courtenay	68
Marinas Campbell River & North	73
Vessel to vessel	9, 67, 68, 69, 72, 73
Traffic Control	
Victoria	11
Vancouver	12
Comox	71
Tofino	74

Again, every major port area has a NOAA or Environment Canada weather channel active. The same eight frequencies are in use throughout Canada and the United States. If your weather radio has ten channels, then the remaining two are for the Canadian continuous marine weather broadcasts on 161.775 or 161.65 MHz.

❖ Amateur Radio

The amateur bands have again given some interesting marine and marine related communications. The Maritime Mobile Service Net on 14,300 USB is interesting listening. I have heard many yachts from the Caribbean and South America on this frequency. Please look for yours truly, VE3GO, on this frequency as I check in as often as I can.

For those of you who wish to use amateur radio marine mobile, the ARRL book, *Amateur Radio on the Move*, is a good purchase (See page 60 for a review.). Besides the technical hints it gives, there are many listings for marine related nets and frequencies. The list is too long to give here, but it includes the following:

	UTC	kHz
Pacific Maritime Net	0330	14300
Mississauga Maritime Net	1200	14121
East Coast Waterway Net	1245	7268
Power Squadron Net	1700	14323

They also include many non-amateur frequencies of interest to boaters. An example is 8104 kHz USB which is used for the Caribbean Marine Nets at 1215 And 1230 UTC.

❖ Correction

Rob Smith of Courtenay, BC, sent a corrected list of BC Lighthouse Frequencies. Please disregard the 525 MHz listings. The correct 140 MHz listings are as follows:

148.060 / 143.360
148.615 / 143.625

148.525 / 143.535
148.975 / 143.985
148.990 / 143.655

❖ HF Marine Frequencies

If you are looking for coastal radio frequencies other than those for North America, use the web site www.coastalradio.org.uk. You can find listings for many countries here.

Also, I have come across a frequency for Amoco Oil in Wood River, Illinois, and Andrie Marine in Muskegan, Michigan. They are listed as having a license for 2182 kHz Marine frequency use. I would appreciate hearing from readers if this is an out of date listing or the companies are still using HF radio.

Another frequency that has come up is 2237 kHz. I am told the icebreakers in the Detroit river area sometimes use this frequency for communications. Again, I would appreciate hearing from readers if this is true. So far, I have not heard any traffic on the frequency

❖ Shack Upgrade

Renovations to my radio shack have been completed and I can now enjoy searching for stations. Two Kenwood R-5000 receivers and a Racal 6778C are being used to monitor the HF bands. Antenna modifications will have to wait until spring, which the groundhogs say will be early. For now, I have to remove the snow that the gales have blown onto my driveway before I can relax by listening to the great DX which is coming in over the radio (such as Point Reyes California weather on 4426 kHz).

I am particularly listening for the 3Y0X DXpedition to Peter Island in the Antarctic. It should be quite a reward to work this station with 100 watts output and an R-7 vertical. At least I worked their transport vessel as it headed to the island from South America. They used the call XR9A and were on 18 MHz CW.

73's Ron VE3GO

Marine VHF Frequencies in this article

Channel....	Frequency MHz
5	156.250
6	156.300
7	156.350
9	156.450
10	156.500
11	156.550
12	156.600
13	156.650
14	156.700
16	156.800
18	156.900
19	156.950
22A	157.100
26	161.900
65	156.275
67	156.375
68	156.425
69	156.475
71	156.575
72	156.625
78	156.925

Buttoning Up the BBB-4

It works! – My BBB-4 Receiver, that is. In case you're just joining us, we're picking up where we left off last month with the construction of a Natural Radio receiver called the "Bare Bones Basic-4" (BBB-4). This simple device can be built entirely from Radio Shack parts, and based on my early findings it appears to be an excellent performer. In fact, it rivals the performance of any commercial model that I have tested to this point.

❖ Home Stretch

So how are you coming with your receiver? Let's assume you've already populated the perfboard, or are about to finish this phase of the construction. The next step is to mount the board and other items inside the enclosure. Before doing this, I recommend taking some time to re-check your wiring. In my case, I accidentally hooked C8, the output coupling capacitor, to a ground point instead of Q2's collector. It was an easy mistake to make, but the circuit definitely would not have worked this way. The moral: double-check everything!



Photo 1. It's not fancy, but it does the job. This view shows the circuit board and other parts mounted inside an aluminum enclosure.

Before drilling any holes, give some thought to how you want to arrange the parts (perfboard, antenna and 9V battery) in the box. You may also want to add some "extra" items. For example, I decided to add an on/off switch and a mini-phono jack on the end panel of the enclosure. Although not mandatory, the switch provides an easy way to disconnect the battery, and the phono jack provides a means to connect the receiver to an outboard speaker-amplifier (see last month's text).

After deciding on a layout, I mounted the switch, mini-phono jack and antenna, making sure to insulate the antenna rod from the enclosure. Next, I marked the four holes for the circuit board using a fine point marker. After drilling the holes, I mounted the board using tubular spacers and nut and bolt assemblies. A strip of Velcro® was used to mount the battery inside the box. (Metal brackets are also available for this purpose.)

The only remaining task was to wire the switch, jack and antenna rod to the appropriate points in the circuit with short pieces of hookup wire.

❖ Checkout

Old timers call this part of a project the "smoke test," but you won't be seeing any smoke with a low voltage, solid-state circuit such as this. It will either work or not. Fortunately, testing the unit is simple.

Turn on the speaker-amplifier (low volume), extend the antenna, and then turn on the receiver. You should immediately hear a loud hum from the speaker-amplifier. This is the 60 Hz powerline hum that will be very strong in almost any developed area. Touch the antenna rod, and you should hear a pronounced change in the hum volume. If your receiver passes these tests you can be quite sure it is working properly.

❖ Hearing the Good Stuff

Now that you've used powerline hum to verify the BBB-4 is working, you'll probably spend the rest of your natural radio listening career trying to get away from it. The hum masks all but the strongest natural radio signals, so it's essential to get away from AC lines if you are to succeed at hearing anything meaningful.

I found a low spot in my backyard, about 300 feet from a powerline, where the hum dropped to an acceptable (yet still audible) level. An open space, such as a park or ball field might also be worth a try. The best advice is to try several different locations until you have a selection of "quiet" sites to listen from.

I tested my unit on a clear, cold night. As I trudged through the snow, I could hear the static I was generating with each step. (Another sign that the BBB-4 was working well.) Once I found the "sweet spot" in my backyard, I was able to hear a variety of Tweaks and Pings coming from the speaker. Conditions were not prime for hearing Whistlers on this night, but I'm sure that will come at another time. I also heard a faint on/off "beeping" sound, which I later learned was likely coming from the Russian Alpha navigation system operating near 15 kHz.

Not to get too "mushy" about it, but I must say that there was something very special about listening to these sounds on a clear winter night, with an occasional shooting star gracing the sky and the hoots of a nearby owl filling the air. It's something you must experience to fully appreciate.

There is much more we could discuss about Natural Radio, but for now you can get used to using the BBB-4 and check out the many sources of information that exist on the web. I highly recommend LWCA's web site (www.lwca.org/)

and Stephen P. McGreevy's site (www.auroralchorus.com/). They are loaded with useful tips and sound samples of natural radio signals.

Warning: NEVER use this (or any other natural radio receiver) when there is lightning occurring in your area.

❖ VLF RADIO! Update

VLF RADIO! A recording I first released in 1998, is now available on CD thanks to remastering by Jacques d'Avignon (ON). There is no change in price for the CD version (\$13.95). See ad on page 21.

❖ Beacon Loggings

This month's loggings are provided by Fraser Bonnett (PA), W3UTD. Fraser uses a Collins R-390A and LF Engineering active antenna. He logged a few new stations shown in the list below, but notes that most have been heard before. Interestingly, he connected his antenna to the receive-only port of a Yaesu FT-1000MP, and found that several signals audible on the old R-390A could not be heard on the Yaesu.

198 DIW	Dixon, NC
209 SYS	Somerset, PA
216 CLB	Wilmington, NC
245 YZE	Gore Bay, ON
248 UL	Montreal, QC
272 YQA	Muskoka, ON
273 ZV	Sept Iles, QC
289 YLQ	La Tuque, QC
303 YPP	Parent, QC
329 YNN	Hornepayne, ON
332 YFM	Le Grande, QC
336 BDB	Accomack, VA
341 YYU	Kapuskasing, ON
344 CL	Cleveland, OH
351 YKQ	Waskaganish, QC
353 QG	Windsor, ON
360 PN	Port Menier, QC
362 SB	Sudbury, ON
363 RNB	Millville, NJ
366 YMW	Maniwaki, QC
373 AEA	South Hill, VA
378 RJ	Roberval, QC
382 YPL	Pickle Lake, ON
392 ML	Charlevoix, QC
394 YB	North Bay, ON
407 RV	Reedsville, PA
419 RYS	Grosse Ile, MI
521 TVX	Greencastle, IN
526 ZLS	Stella Maris, BAH



Figure 2. Here's a view of the completed BBB-4 ready for action. I used two strips of Velcro® to attach the outboard speaker-amplifier to the front of the case, and a short patch cord to link the BBB-4 to the amplifier input.

Howard Stern Hit by Pirate Relays

Pirate radio made the national news in early 2006. It took Howard Stern to do it. Since January 9, Stern's nationally syndicated radio program went off the air on all local licensed broadcasters in the USA. It is now carried exclusively on a paid subscription basis on the Sirius satellite radio network.

Various local FM pirate stations quickly began pirate broadcasts of Stern's show in January. Some were located in New Jersey and New York, while others were located in other regions of the United States, including Minnesota and Massachusetts. In addition, some Howard Stern fans posted digital copies of Stern's Sirius radio shows on the internet. Numerous file sharing networks quickly showed up on the internet with digital copies of Stern's satellite broadcasts.

Stern clearly has helped the Sirius network, which reports an increased subscriber base to their satellite network now that Stern is part of the program lineup. But, some Howard Stern fans have been searching around for a means to hear his shows for free, just as they did in prior years when his broadcasts were carried on licensed commercial radio stations.

Ironically, Stern's first response was to appeal to the FCC for protection. Stern previously had numerous conflicts with the FCC who fined him for "indecentcy" on his program, in the days when he was carried by commercial radio stations. Suddenly, Stern's vicious attacks on the FCC were transferred into calls for the FCC to protect his own "intellectual property rights."

Numerous national media, notably the Los Angeles Times and Harry Helms' excellent internet blog, *The Future of Radio* at http://futureofradio.typepad.com/the_future_of_radio/ quickly covered the pirate relays of Stern's show in several regions of the United States.

As of press time for this issue of *Monitoring Times*, the Federal Communications Commission had announced no busts of pirate radio stations illegally relaying Stern's Sirius satellite show. But, the FCC periodically shuts down FM pirates all across the United States, so that situation can change at any time. Halting internet podcasts of Stern's show is a more difficult technical issue.

So, Howard Stern now has joined forces with licensed broadcasters to demand swift action by the FCC to protect his own economic position from attack by pirate radio operators.

❖ Radio Insurgente

Veteran DXer Bob Wilkner in Florida stunned the DX world with a logging in *DXplorer* of the Mexican clandestine station Radio Insurgente on 5999.96 kHz at 2104 UTC on January 27. They

had been previously heard in North America only via their <http://www.radioinsurgente.org/> internet web site. The station is the voice of the Ejército Zapatista de Liberación Nacional rebels in southern Mexico. Their web site still announces weekly broadcasts on Friday at 2100 UTC using a frequency of "6.0 MHz in the 49 meter band." Until Bob's logging, Insurgente logs were virtually unknown in North America.

Bob heard discussions of Yucatan, marching music, drums, and vocals by a chorus. You can actually hear these programs via archived audio on their web site, but Bob's shortwave logging of the station was a superb DX accomplishment. It will be hard to match. Propagation into North America with a low power transmitter on 6 MHz during afternoon daylight hours will certainly be poor to nil in most areas of the continent. But, if you live in areas adjacent to Mexico, this one is now a superb (but no longer impossible) DX challenge.

❖ Oldest Pirate QSL?

Jerry Berg, the longtime organizer of the Committee to Preserve Radio Verifications, announces that the CPRV has received an outstanding QSL donation from Annette Bell of Hawke's Bay New Zealand. Her father, George Inglis, unfortunately passed away. She generously donated George's QSL of PCJ in Eindhoven, the Netherlands. This QSL was dated August 29, 1929, and it is now the oldest shortwave QSL in the CPRV collection at the University of Maryland.

We often discuss pirate QSLs in *Monitoring Times*, but it would be interesting to know who holds the oldest pirate QSL in their collection. Your editor's oldest pirate QSL was a card from **World Music Radio**, relayed by **Radio Dublin** on May 6, 1983. Certainly many *MT* readers have older pirate QSLs in their collection. What is your own oldest pirate verification? Let us know.

❖ Airborne Radio Marti

Radio Marti is once again attempting to send a signal into Cuba via airborne transmitters in Florida. But, loggings of this one are still extremely sporadic. One exception was an excellent logging by Terry Kreuger in Florida of the station on 530 kHz. Through the first two months of the year, Terry says that the station has only been heard on Saturdays around 2100 UTC, beginning on January 21 and only irregularly afterward. When the station is active, it is often jammed by Cuba. Here is yet another attractive DX target for those of us who live in the southeastern USA. But, daytime propagation on 530 kHz during the daytime will not extend far.

❖ New Free Radio Weekly Editors

Free Radio Weekly, one of the few remaining sources of North American pirate radio logging information, announces the appointment of two new editors. Veteran DXers Bill Finn and Ed Kusalik now join the stable of rotating FRW editors. If you have logs for FRW, and if you would like to receive this publication in your own e-mail, you can contact either Bill at bill.frw@gmail.com or Ed at ekusalik@telusplanet.net via e-mail. *Monitoring Times* welcomes both Bill and Ed to the publishing side of our hobby.

❖ What We Are Hearing

Monitoring Times readers heard over two dozen North American pirates this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. April Fools Day is considered a major holiday by pirates, and so is Easter. The primary North American pirate frequency of **6925 kHz**, plus or minus 30 or 40 kHz remains the best place to scan for the pirates.

Captain Morgan- Rock and roll oldies music and audio from the old Twilight Zone TV show are normally heard here. (None, says to send loggings to the Free Radio Network web site, and has QSLed lately)

Channel Z Radio- They relay Europirates, but they also produce their own pop music broadcasts. (channelzradio@gmail.com)

Cracker Radio- Their parody of southern humor includes the song that "There are No Wal-Marts in Afghanistan, but there are Targets everywhere." (Merlin and crackerradio@pmoll.com)

Grasscutter Radio- The lawn mowing guy still programs rock music, sometimes in association with **Sunshine Radio**. (grasscutterradio@yahoo.com)

Ground Zero Radio- Dave Gunn recently aired a program of Johnny Cash country music, apparently to prove that his "duck and cover" nuclear war programming is not always sandwiched in among rock music tunes. (Elkhorn)

Iron Man Radio- Classic rock music is the staple on this veteran pirate, which has returned to the air. (Belfast)

James Bond Radio- Their specialty is music from the old James Bond spy movies. (None)

KCBM- To extend their range, Ken and Barry on this west coast pirate sometimes add CW Morse code segments to their 6990 kHz broadcasts. (kcbm_2@yahoo.com)

KIPM- Alan Maxwell's complex drama broadcasts are unlike any other shortwave broadcasting station. Some recent shows gave the old Lula maildrop, but that GA address has long been closed. (Elkhorn)

Melvin Malfunction Radio- Melvin, a veteran pirate operator, has returned with rock music and current world news in his format. (melvinmalfunction@yahoo.com)

Punxatawny Pothead- Proving that pirates take holidays seriously, this one appeared on Groundhog Day. (Belfast)

Radio Free Whatever- Broadcasting from the right coast, they concentrate mainly on rock music. (radiofreewhatever@yahoo.com)

Radio Pigmeat International- Pigmeat Martin's rock music has returned to the pirate bands. (Belfast)

Sierra Papa- This pirate occasionally broadcasts music,

Continued on page 61

Five New Radio Reads

April is always a funny month in this region of the country (New Jersey and its immediate surroundings). Like October on the other side of the year, the weather is always a bit more unsettled than you wish it would be. The warmer, dryer days will more than likely find me on the roof doing antenna work. However, there are enough strange, cold and clammy days to justify sitting by a nice warm fire with a good book or two.

For me, this usually means checking out the latest in amateur radio reading and then sharing my thoughts with you folks. As always, there are a lot of great books written to help hams of every skill level have a lot more fun on the bands. My good friends at the American Radio Relay League (ARRL) sent me a nice box full of books a few weeks back. Allow me to crack them open and give you the 411.

All the books reviewed here are available from:

The American Radio Relay League
225 Main St
Newington, CT 06111
1-888-277-5289
<http://www.arrl.org/catalog/>

The 2006 ARRL Handbook
for Radio Communications
(83rd Edition)
No. 9493 Hardcover \$54.95
(ISBN 0-87259-949-3)
No. 9485 Softcover \$39.95
(ISBN 0-87259-948-5)
Both versions include the 10th
CD ROM Edition of the
Handbook



You are probably wondering how I can write anything new about a book I review every year. When that book is *The ARRL Handbook*, that is never hard at all.

First and foremost, part of the task of this column is to attract and nurture new hams. I was reading then current editions of *The Handbook* three years before I ever sat down to take my original Novice Class test back in 1976. The amount of information about the ham hobby and radio electronics in general found in the pages of *The Handbook* cannot be surpassed by any other text. Grant it, a newbie is going to be confused by a lot of what is between these covers, (I certainly was), but the answer to any question I asked, even back then when I was starting out, was easily found in *The Handbook*. I tell every new ham to pick up a copy. I make a point of giving last year's edition to someone I am currently Elmering to give them a good

foundation in the hobby.

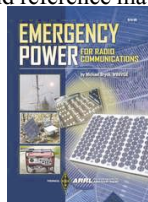
Every edition since way back in 1926 includes all the most up to date theory and practice information that every ham should have to hand. And each successive edition brings information about new technologies and, of course, a number of new projects that will keep the soldering iron warmed up on any ham's work bench.

The most notable of the new projects in the 2006 edition is an amazing high-power HF linear amplifier project using the new Eimac 3CX1500D7 power triode. Now as you all know, I am a dyed in the wool QRP'er by nature. But when we get into the bottom of the solar cycle as we are now, even a peanut whistle guy like me can appreciate what legal limit power can do. I may not try my hand at building this design myself, but when I am trying to punch a hole in the ether with a teensy 2N3866 or 2N3553 final, I wouldn't mind warming my toes on the case of a Full Gallon amp. If you are not committed to low power and you are ready for the ultimate challenge in amateur radio construction, this amplifier design is just the thing.

Every edition includes contributions by prominent hams known for their technical acumen. Among those contributing this year are such folks as Ed Hare W1RFI, Dave Benson K1SWL, L.B. Chebik, W4RNL and George Heron N2APB. All folks I have run across during my ham radio career and have written about in the pages of *MT* at one time or another.

Also, as in recent years, the book comes with the complete text on CD ROM. The disk is fully searchable and includes many color images, additional software and reference materials.

Emergency Power for Radio
Communications
By Michael Bryce WB8VGE
#9531 \$19.95 (ISBN: 0-
87259-953-1)



With the focus on amateur radio and disaster management brought about by recent world events and weather, good information on emergency power operations needs to be in the hands of every ham radio operator who wants to be ready to do his or her part when things get rough. Several folks have written on this subject over the years, but The League turned the topic over to the true master of the art, Mike Bryce WB8VGE.

Mike is a member of the QRP Hall of Fame

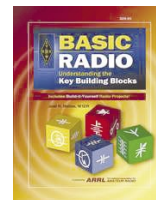
and his articles on low power and emergency power operations have appeared in most of the major ham radio publications. He was the editor of the QRP column for 73 magazine for over 12 years. Mike has been experimenting with solar electric power for decades and his personal solar power system has the capacity to power his entire household, not just his rigs. Mike writes in an easy going style that makes even the more difficult engineering aspects of taking your radio shack "off the grid" seem fun and easy.

Mike breaks down the subjects of power acquisition, management, storage, and usage across a series of practical examples. Solar, fossil fuel, even wind and water are all covered and the pluses and minuses of each are fully discussed. Where most of us casual emergency power people go astray is in the area of power management. We also tend to lack a complete understanding of battery systems and other forms of power storage. Mike walks us through the problems we may face in bringing our personal systems together so that our back-up power is as dependable (perhaps more so) than the juice leaking out of those plugs in the wall.

The book's appendices include the best explanation of how to use the new Anderson Powerpole® Connectors I have ever read (including those I have written myself), as well as a number of emergency power related projects from past issues of *QST* magazine.

This is a very important book, not just for hams, but for anyone interested in maintaining some level of electrical power capability during times of distress. I can commend without fear of contradiction: Read it before you need it!

Basic Radio - Understanding the Key Building Blocks
by Joel Hallas W1ZR
#9558 \$29.95 (ISBN: 0-
87259-955-8)



You have probably heard me lament more than once in these pages about the way the Amateur Radio License testing is generally conducted these days. Folks are more or less encouraged to learn the question pool and not very much else. This certainly misses the point of good amateur radio practice. A practical knowledge of how radio works is essential to having any real success as a ham.

But how do you give a good working

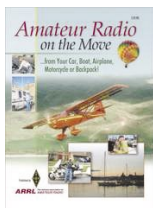
knowledge of radio to folks without expecting them to earn their BSEE along the way? Several folks have tried and it really looks like Joel Hallas W1ZR has hit the mark. Joel has both BS and MS degrees in electrical engineering and he has taught the subject at the college level. He is also the Technical Editor for *QST* magazine. So he knows a thing or two about getting this information across to people.

When I first started to read through *Basic Radio*, I couldn't help but go to my bookshelf and take down my 1971 edition of the League's book *Understanding Amateur Radio*, the "basic radio" of its time, and the book I read when I was just beginning to figure this stuff out for myself with the help of a few good Elmers.

While that old ARRL red and black covered text gave me a sound foundation, Joel's book does a much better job of presenting the fundamentals of radio in an easy to understand manner. Each chapter is broken down into easy to comprehend sub-topics that allow the reader to fully digest the information before moving on to the next topic. Each section includes a brief list of review questions, hinting at the possibility of using this book in conjunction with a license class. I would highly recommend that any club or group setting about the task of bringing folks into the hobby consider adding this text to the training experience. Folks won't just pass the test; they will understand what they are being tested on, and that will make them better hams along the way.

The book also contains a number of simple projects that would be fun for a club "build night" or even in a science/technology classroom setting.

Amateur Radio on the Move... from Your Car or RV, Boat, Airplane, Motorcycle or Backpack!
#9450 \$19.95 (ISBN: 0-87259-945-0)



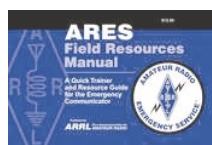
Very few hams operate exclusively from a fixed position. When I got started in the hobby, the standard setup seemed to be an HF rig in the shack and 2 meters in the car. Of course with a proper understanding of the equipment and the vehicles involved, a ham radio operator can put a signal out on any band from, as the book title suggests, any motor vehicle, aircraft, boat, or even if traveling on foot (or by bicycle as your intrepid columnist is known to do from time to time.)

This book collects the writings of eight experts on the subject of mobile amateur operations. It is divided into sections on working the world from your automobile, maritime mobile, aeronautical mobile, RV and motorcycle mobile, as well as a section called HF Unplugged for backpacker types. Each of these variations on mobile operation brings about unique issues that must be addressed.

The authors look at the radios, power acquisition, installation, antennas, noise reduction, operating tips, software and, most importantly, safety. So, no matter if you operate from your car or from the top of a mountain, this excellent collection of mobile operation

information will give you a thing or two to think about before you set off on the road, or in the air, or where ever. Note to the publisher... I'd be happy to help write a chapter on Bicycle Mobile for the next edition.

ARES Field Resources Manual
#5439 \$12.95



As they often say, "Last but not least," the *Amateur Radio Emergency Service (ARES) Field Resources Manual* is a training and resource guide for anyone involved in amateur radio emergency communications. Of course, if you are a ham, I strongly suggest you become involved in your local ARES organization. If you do, a working knowledge of the information in this book will go a long way toward bringing you up to speed in how to manage radio operations during difficult times.

But even if you're not active in ARES for some reason, knowing the information in this book will help you in many ways. For example, the Basic Deployment and Extended Deployment Checklists show exactly the kind of supplies and preparedness information that any ham would want to take prior to needing to deal with an emergency of any kind.

The explanations of the National Traffic System (NTS), Radio Civil Emergency Service (RACES), Incident Command System (ICS) and National Incident Management System (NIMS) are an excellent primer in how response to (and control of) an emergency evolves. This book deserves a place very close to every ham's microphone or key.

So there you have five great radio reads to get you through the raindrops of April. If I am not reading or climbing on my roof, look for me on the bottom end of 40 meters. Have fun!

UNCLE SKIP'S CONTEST CALENDAR

Missouri QSO Party

Apr 1 1800 UTC - Apr 2 0500 UTC
Apr 2 1800 UTC-2400 UTC

QCWA QSO Party

Apr 1 1800 UTC - Apr 2 1800 UTC

ARS Spartan Sprint

Apr 4 0100 UTC - 0300 UTC

ARCI Spring QSO Party

Apr 8 1200 UTC - Apr 9 2400 UTC

Georgia QSO Party

Apr 8 1800 UTC - Apr 9 0359 UTC
Apr 9 1400 UTC - 2359 UTC

Yuri Gagarin International DX Contest

Apr 8 2100 UTC - Apr 9 2100 UTC

Montana QSO Party

Apr 8 2300 UTC - Apr 9 2300 UTC

Florida QSO Party

Apr 22 1600 UTC - Apr 23 0159 UTC
Apr 23 1200 UTC - 2159 UTC

Outer Limits continued from Page 59

but normally its main purpose is to encourage two-way QSO ham radio-style conversations among pirate operators. (None)

Sunshine Radio- In an unusual situation within pirate radio, the rock music on this station is spun by a female DJ. (grasscutterrado@yahoo.com)

Take it Easy Radio- Inspired by the Eagles' famous rock song about Winslow, AZ, they mix other rock and pirate discussions into their shows. (Merlin)

The Crystal Ship- Left wing political commentary with rock music comes from The Poet on various unusual frequencies such as 1710, 3320, 6854, 6875, 6925, and 9057 kHz. He tells MT that 6875 is his main frequency. (Belfast and tcshortwave@yahoo.com)

Undercover Radio- Dr. Benway still plays rock music and drama sketches "from the middle of nowhere. (Merlin and undercoverradio@mail.com)

Voice of Captain Ron Shortwave- The captain plays rock music and discusses pirate radio issues. (captainronswr@yahoo.com)

Voice of Laryngitis- Genghis and Stanley Huxley cleaned out their years-old pile of reception reports, and they sent out classic gagged broadcaster QSLs such as the one that we see here. (Belfast)



Voice of the Islands- They claim to broadcast from Pelee Island in Lake Erie from Canada. Their frequency is often around 13888 kHz. (Merlin)

WBUG- So far this new one has only been heard with tests, and a "Talk Radio" slogan. (none)

WBNY- Commander Bunny, the leader of the rodent revolution, transmits spy numbers messages to others in the revolution, along with music that often includes the "Peter Cottontail" Easter song. Sometimes he uses FM modulation, but that has not worked well. (none)

WMPR- The techno rock "dance party" format at Micropower Radio remains a regular fixture on the pirate bands. (None, has QSLed only at the Winter SWL Festival)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations, especially in Europe. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkhorn, NE 68022; and PO Box 293, Merlin, Ontario N0P 1W0. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence.

Since the demise of *The ACE*, the best bulletin for submitting pirate loggings with a hope that pirates might QSL is the e-mailed Free Radio Weekly newsletter, free to contributors via yukon@tm.net. A few pirates will sometimes QSL reports left on the Free Radio Network web site, at <http://www.frn.net>

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Ray Bauernhuber, NY; Kirk Baxter, North Canton, OH; Ed Bernies, Philadelphia, PA; Artie Bigley, Columbus, OH; Jerry Coatsworth, Merlin, Ontario; Wendel Craighead, Prairie Village, KS; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Smithville, TX; Hans Johnson, QTH not listed; Terry Krueger, Clearwater, FL; Harald Kuhl, Germany; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; Mark Morgan, Cincinnati, OH; Pigmeat Martin, Belfast, NY; John Poet, Belfast, NY; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; Lee Silvi, Mentor, OH; Bob Wilkner, Pompano Beach, FL; Niel Wolfish, Toronto, Ontario; John Wagner, Pickerington, OH; and Joe Wood, Greenback, TN.

The Life and Times of a Radio Signal

Over the years I have enjoyed the art and science of radio as a ham, technician, shortwave and scanner listener, tech-writer, radio-TV repairman, and broadcast-station engineer. And it still seems miraculous to me that by simply turning a knob we can receive radio signals that may have originated next door, in another city, or even as far away as other side of the world. This month let's take a look at some of the things that happen when sending and receiving those radio signals.

❖ The Birth of a Radio Signal

To produce useful radio signals we must first convert direct current from a battery or a power supply, into radio-frequency (RF) current of the frequency desired for the signal. The device used for this purpose is, of course, a "radio transmitter." The type and amount of circuitry used in transmitters varies greatly; however, a radio signal begins life in one or more of the transmitter's circuits called "oscillators." Usually there are also circuits in the transmitter which amplify the RF current so that more energy than that available from the oscillator can be transmitted. Modulation, which is accomplished by other circuits in the transmitter, is the process of adding information (voice, music, video, telemetry, etc.) to the RF signal.

❖ From the Transmitter to the Antenna

From the transmitter, the RF current is routed to the transmitting antenna so that the current can be launched into space as RF waves.

The routing of this current may be accomplished by connecting the transmitter output circuit directly to the antenna, or by connecting the transmitter output to the antenna by way of a transmission line or wave guide.

❖ Launching Waves into Space

Antennas are devices specifically designed to launch radio waves into space. When electrons accelerate or decelerate, then electromagnetic radio waves are emitted. Of course the current coming to the antenna from the transmitter is radio-frequency current which continually accelerates and decelerates within each cycle. Thus, as RF current flows on an efficient antenna, a significant portion of that current is converted to radio waves and is radiated into the space around the antenna. It is also true that some of the RF current flowing on the antenna is lost to the communication path due to its being converted to heat by the electrical resistance of the antenna, or by inducing currents in nearby conductive objects such as metal buildings.

❖ Where Does the Antenna Direct Its Signals ?

Key factors in antenna performance are the size, shape and number of its elements, and the spacing of the elements from one another. The design of the antenna and the location of the antenna with respect to the earth are important factors in determining the direction of travel taken by waves launched from the antenna.

We usually consider both horizontal (compass directions) radiation patterning, and vertical radiation patterning (angles from low, parallel to the earth, on to straight up).

The pattern in which waves are launched in terms of compass directions is usually determined primarily by the configuration and method of feeding the antenna's elements. On the other hand, the distribution of radiation launched at the various vertical angles is often more a function of how high the antenna is situated above the earth. Nearby objects such as a metal building can also affect the antenna's radiation patterning.

So, when we think of the performance of an antenna we usually consider both the antenna's design, its location with respect to the earth, and any other large objects in its immediate environment. This combination of the antenna and its nearby environment is then thought of as the "antenna system."

In terms of both the horizontal and vertical radiation, an antenna system can be designed to be relatively non-directional, somewhat directional, or highly directional (beam antennas). For broadcast stations whose intent is to serve stations in all directions from the transmitting antenna, horizontally non-directional antennas are desirable. For point to point communications, beam antennas are usually preferred.

❖ Travel of Radio Waves Between Antennas

The travel of waves through space is usually called "signal propagation." The radiation pattern of the antenna system determines the directions in which the radio waves head as they leave the antenna. When the landscape permits, signals can travel directly in a line-of-sight between the transmitting antenna and a receiving antenna. Others, at low frequencies, may follow the curvature of the earth far out beyond the horizon — even around the earth.

When signals reflect from the ionosphere (fig. 1), higher angles of radiation lead to the signal being returned to earth close to the transmitting antenna site (fig. 1A). The lower the vertical "takeoff" angle that the waves have, the more likely they are to reach out beyond the horizon (fig. 1B). The return of signals from the ionosphere is most useful at HF and MF frequencies. At frequencies above the HF band, signals directed into the ionosphere are likely to punch through the ionosphere and travel into outer space, never to return.

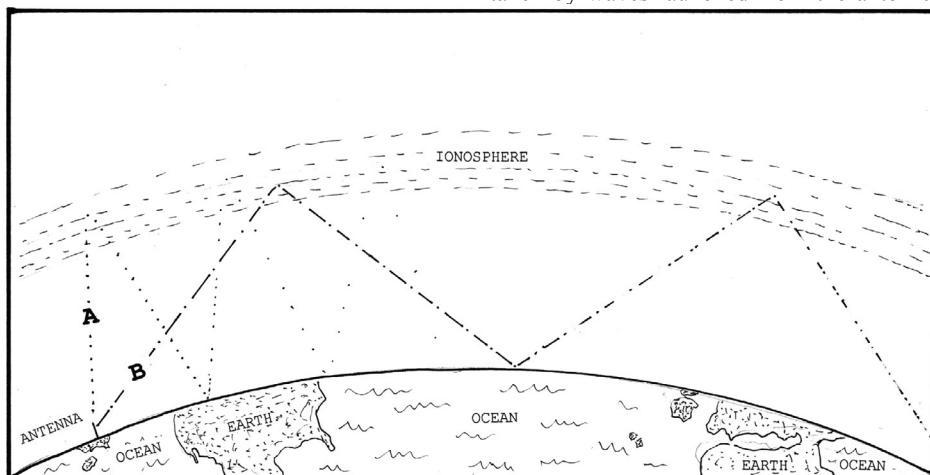


FIG. 1. A high vertical angle of radiation results in signals returning to earth relatively near the antenna (a), signals at lower vertical angles return to earth farther from the antenna (b).

This Month's Interesting Antenna-Related Web site:

A good discussion of antenna fundamentals:
[http://en.wikipedia.org/wiki/Antenna_\(electronics\)](http://en.wikipedia.org/wiki/Antenna_(electronics))

❖ Capturing Waves at the Receiving Antenna

If the antenna is to be used to receive signals from all directions, then a non-directional antenna is a good choice. Another option here would be a beam antenna that could be rotated to any compass direction. For reception from one particular direction, a directional antenna or beam antenna would be a likely choice.

Some of the energy captured by the antenna will be lost as heat in the resistance of the antenna's elements, and some will be re-radiated back into space. However, with an efficient antenna much of the energy captured by the receiving antenna will be routed to the receiver's antenna input circuit.

❖ At the Receiver

As the radio waves propagate through space they spread out, and thus diminish in strength. The amount of signal which finally reaches a distant receiving antenna may be a million or more times weaker than the power initially radiated from the antenna. Signals with a strength of less than a microvolt (millionth of a volt) at the receiver's antenna input terminals can often support successful communication.

In the receiver's circuits the signal's modulation is detected (removed from the signal), usually amplified, and possibly processed in some way (such as decoding of coded signals). The results are then routed to a device such as earphones, a speaker, video monitor, data-display monitor, or other appropriate output device.

❖ And So

The above sequence of events represents what typically takes place when a radio signal is generated, launched, propagated, captured, and ultimately processed by a receiver. Just pushing the transmit switch and talking into the microphone of a transmitter may be simple acts, but the resulting sequence of electromagnetic activity forever remains an elegant and awe-inspiring phenomenon.

RADIO RIDDLES

Last Month:

I asked: "Are the model antennas that are built for checking antenna function somehow different from ordinary antennas? Are they only models, or can they be used as working antennas in regular communication applications?"

The answer is that they are actual, working antennas. If they are made of durable components and constructed with reasonable care,

they will give good service just as any other antenna.

The difference between model antennas and the lower-frequency antenna which they model is that models are designed to perform at frequencies high enough so that they are small, and thus easily handled and evaluated. The information on their design thus gained is then used to build, from the same design, the larger antenna for which the model was originally created.

This Month:

Just as I have done below, I always sign off this column using both the terms "DX," and "73." What do these terms mean, and where did they come from?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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A.C.-D.C. "Depression Radios"

Now that the restoration of the HQ-120 (aka "The Radio From Hell") has thankfully been completed, let's take a breather from restoration for a bit and continue our ongoing discussion of broadcast radio receiver evolution. We left off (February 2006 issue) after we had traced radio development from the first a.c.-powered radios in the late 1920s to the distinctive "tombstone" and "cathedral" table models, and the grandiose living room consoles, that soon followed.

The depression years were good years for the radio industry. Cash-starved families that managed to get their hands on a set could receive entertainment for free without leaving their living rooms. And advances in vacuum tube technology made it possible for radio manufacturers to produce small, shelf-sized receivers at rock-bottom prices.

One of the cost-cutting strategies was to eliminate the expensive power transformer. And one useful side effect of this lack was that the radio would operate on d.c. current as well as a.c. This was a definite selling point in the downtown areas of many big cities, which were still supplied with d.c. power from Edison Electric Illuminating Company dynamos. The downsized sets were known as ac.-d.c., or "universal" receivers.

❖ The First A.C.-D.C. Set

The first of these minimal radios is said to have been the "International Kadette Universal TRF Receiver" of about 1932. Being a TRF (tuned radio frequency) and not a superheterodyne, it didn't require an oscillator/mixer (or converter) tube. It squeezed satisfactory reception from just three tubes (Figure 1): a 39 r.f. amplifier, a 36 detector and a 38 power amplifier. Of course there was also a rectifier tube which, in this case, was a cold cathode (no filament) type K-31.

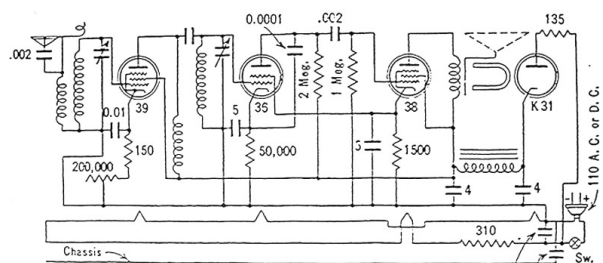


Fig. 1. Circuit of the "International Kadette Universal TRF Receiver." Introduced about 1932, it may have been the first a.c.-d.c. set.

Emerson presents the Amazing New UNIVERSAL COMPACT RADIO

Operates from any Lamp Socket

—on EITHER
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110 Volts — 25 to 60 Cycles

SIZE: 10" Wide - 4 1/2" High - 4 1/2" Deep
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Retail Price
\$25

COMPLETE with Cunningham Tubes and Built-In Aerial

Pictures of the International Kadette are hard to come by, but the circuitry of this Emerson receiver is virtually identical. Note diminutive size.

Since there was no power transformer to step it up, the 110-115 volt line voltage was rectified and filtered directly to provide d.c. for the Kadette's plates and screens. The filter network consisted of a small choke and two 4- μ F capacitors. Though the resulting d.c. voltage was limited, the tetrode and pentode tubes in the Kadette supplied enough gain for adequate sensitivity and volume—particularly since the radio stations of the era were more numerous and beginning to broadcast with much more power.

Lighting up the three tubes took a bit of doing. Designed for use primarily in auto radios, they all had 6-volt heaters. Since they all drew the same current (300 mA), they could be operated in series like old-fashioned Christmas tree lamps. In that configuration, it would take 18 volts to power them. But with no transformer to step it down, the 110-115 volt line voltage would somehow have to power the heaters directly.

The solution was to put a 310-ohm power resistor in series with the three heaters. Ohm's law tells us that, at current of 300 mA, a 310-ohm resistor will drop 83 volts. Added to the 18 volts dropped across the three tubes, we have a series string totaling 111 volts—suitable for connecting directly across the line.

The little Kadette had a refinement not found in most later a.c.-d.c. sets. Look at the schematic and you'll see no ground (chassis connection) symbols. To avoid connecting

one side of the line to the chassis, a wired B- bus was used. It begins at the bottom connections of the filter capacitors and runs throughout the radio, and all circuit points that would normally be grounded to the chassis if this were a transformer set are connected to the bus instead. The only connection of the bus to the chassis is through a small capacitor.

❖ The Next Generation

The heater and filter circuit of a slightly later a.c.-d.c. set is shown as Figure 2. By this time, a couple of tubes with 25-volt heaters had been developed for use in a.c.-d.c. sets. These were the 25Z5 rectifier and 25L6 power amplifier. Both had 300-mA heaters so that they could be used in series with the 300-mA auto radio tubes. (Note: by this time tube nomenclature had been revised so that two-digit type numbers were no longer used. The new nomenclature began with a number indicating heater voltage, followed by a letter related to the tube's function, followed by a number indicating the number of elements (grids, plates, cathodes, etc.) in the tube.)

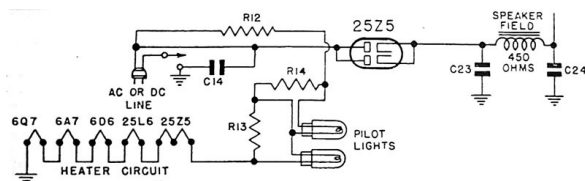


Fig. 2. The second generation of a.c.-d.c. sets made use of some tubes with special high-voltage heaters (here a 25Z5 and a 25L6). Note speaker field used as filter choke (see text).

Since this radio happens to be a superheterodyne, it requires one additional tube (an oscillator/mixer) over the number used in the Kadette. The functions of the five tubes are: 6A7 pentagrid converter (oscillator/mixer), 6D6 i.f. amplifier, 6Q7 detector/first audio amplifier, 25L6 power amplifier, and 25Z5 rectifier. Notice the ground symbols in this schematic. This manufacturer, like most makers of a.c.-d.c. sets, had no qualms about connecting one side of the line directly to the chassis.

The rectifier tube here has a filament in contrast to the cold cathode type used in the Kadette. But even though there are five tube filaments in series (two with 25-volt ratings) to be lit up instead of three, the total voltage drop across them is just 68 volts. So, series resistors are still required to increase the



Second-generation wood cabinet sets make interesting collectibles and fit neatly on shelves. This one is just eleven inches wide.

voltage drop to a value approximating line voltage.

In this radio, resistor R12 is a *ballast* – a power resistor that plugs in like a tube. It's housed in a metal shell that is perforated for ventilation. Resistors R13 and R14 are individual power resistors sized to provide proper voltages for a pair of dial lights. In other sets of this era, the necessary series resistor was an extra metal alloy wire embedded in the line cord. The resistance wire would get hot in use, and so it was insulated with asbestos to prevent the cord's other wires and outer insulation from being damaged.

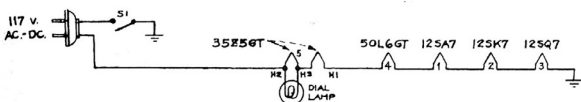


Fig. 3. Heater string of a late 1930s a.c.-d.c. radio. The tube set used, known as "The All-American Five," had heaters specially designed to be series-connected across the power line without the use of a resistor. The 35Z5 heater is tapped to provide voltage for a pilot light.

One more aspect of Figure 2 needs to be explained. It's the coil, marked "Speaker field," wired between filter capacitors C23 and C24. Go back to Figure 1 for a moment and look at the representation of the speaker pictured there (between the types 38 and K31 tubes).

This is a very early style of sound reproducing device called a *magnetic speaker*. It's essentially an overgrown earphone. As the diagram suggests, the plate current of the power amplifier tube flows through a coil mounted in the field of a horseshoe magnet. This results in audio vibrations being induced in a metal armature, which in turn transfers them to the paper speaker cone.

The magnetic speaker fell into disuse fairly quickly – to be replaced by a much more efficient type known as the *dynamic speaker*. Instead of being supplied by a relatively weak permanent magnet, the magnetic field for the dynamic speaker came from a powerful electromagnet known as the *field coil*. The field coil needed to be energized from the radio's d.c. power supply. It could be energized conveniently while doubling as the power supply filter choke.

The a.c.-d.c. sets of this era were made with both TRF and superheterodyne chassis. They are fun to collect because their cabinets, generally wood, were produced in a variety of quaint styles and their small size makes

them easy to display and store. But if you are tempted to work on one of these sets, beware! Chances are, one side of the line will be grounded to the metal chassis. Depending on how the plug happens to be inserted into the wall socket, you may be inviting a nasty shock if you touch the chassis, or perhaps a naked control shaft, while standing on a damp basement floor or touching a water pipe or other grounded object.

❖ The "Streamlined" Era

By the late 1930s, the use of molded plastics in cabinet manufacture made it possible to produce the streamlined forms so popular in this era. Cabinets now had rounded corners and simpler, more flowing, designs. The plastic most used was Bakelite, a material that could be molded into a beautiful hard, glossy finish. Bakelite cabinets were sometimes painted white, ivory, or other colors, but were most often left a natural deep brown.

Another form of plastic, known as Catalin, could be produced in glowing, vibrant colors. Catalin was not as common as Bakelite and, unlike that material, tended to become discolored and fragile as it aged.

Radios with intact Catalin cabinets that have retained their color are highly prized among collectors today.

The superheterodyne circuit was now used almost exclusively. And a new series of tube had been designed with high-voltage heaters specifically for use in a.c.-d.c. circuits.

These glass or metal tubes were perhaps half as high as the former tall glass types and had straight tubular sides instead of the former "double dome" profile.

A typical filament string now looked like the one shown in Figure 3. Note the absence of series resistors. The set of tubes used here had become so commonly used that it was known as "The All-American Five." The set included the 12SA7 converter, 12SK7 i.f. amplifier, 12SQ7 detector/first audio amplifier, 50L6 power amplifier and 35Z5 rectifier. Note that the heater voltages add up to 121 – a safe value for direct connection across the line. Note, also, that the heater of the 35Z5 rectifier has an internal tap to power the low-voltage pilot lamp.

Loudspeaker design had also become simplified. Because of advances in magnetic technology, the speaker field could now be supplied by a powerful permanent magnet rather than the former electromagnet. The new "PM" speakers had no cumbersome field coil and required no power supply connections.

Though there was now no field coil to double as a power supply filter choke, that problem was easily solved. Advances in electrolytic capacitor design had enabled the manufacture of inexpensive units having much higher capacities. The use of these as filter caps in a.c.-d.c. power supplies meant that an inexpensive resistor could be



The introduction of Bakelite and other moldable plastics made it possible to give late-1930s radios the popular "streamlined" look.

substituted for the choke with no sacrifice in filtering action.

This brings our coverage of a.c.-d.c. sets up to the years just before World War II – which are considered to be the end of the classic radio era. Of course, many more of these sets were made after the war. They began to have more compact cabinets when a range of miniature tubes was developed to replace the "All American Five." And newly available plastics made it possible to manufacture the cabinets in a variety of attractive colors.

Though these postwar sets are up to 60 years old, they don't seem to attract collectors as much as the earlier models. However, they will almost certainly become more and more collectable with the passing of time.

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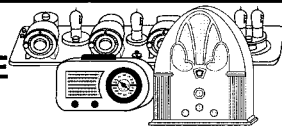
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Digital TV - Truth & Myths

By Doug Smith W9WI

Cable, satellite, VCRs, DVDs, big-screen – television has certainly changed over the last fifty years. However, it might (or might not) surprise you to learn that the underlying standards that define how a TV picture is “painted” on your screen really haven’t changed since 1953. As we enter the 21st Century, however, the way television signals are transmitted is changing, and in a big way. Like it or not, digital television is coming to a TV set near you.

Television is, of course, a scheme for transmitting moving pictures from one place to another. A lens is used to focus the desired scene on a light-sensitive target; the amount of light striking each point on that target is measured and converted to an electrical current. Information about the amount of that current is transmitted to the other end, where it causes another current to flow. When that current strikes an *electrically*-sensitive target, it causes bursts of light, which you see as a TV picture.

In analog TV, signals directly proportional (“analogous”) to the amount of light are transmitted. Leave the lens cap on the camera (resulting in a completely black picture) and the transmitter operates at 75% of full power. Open the lens and point it at the sun (resulting in a completely white picture, until the pickup chip burns out!) and the transmitter operates at 5% of full power¹. Any power value between 5% and 75% is possible – 10%, 40%, 61.547213%.

Digital TV transmits numbers – “digits” – representing the amount of light. An analog TV transmitter would transmit a grey screen by operating at 40% of full power. A digital transmitter would transmit the same grey screen by sending the number 32768 over and over again.

❖ Why digital?

That sounds complicated. Digital TV requires two extra steps: convert the current generated by the camera to a number; then, at the receiver, convert the number back to a current. Why not just stick with analog and dump the conversion? There are several good reasons.

First, noise and interference. Again, in analog, any power value between 5% and 75% is possible. A power level of 61.547213% is perfectly permissible. In over-the-air digital TV, only eight specific power levels are allowed.

Let’s say that your analog station is transmitting a grey screen, at 40% power. Due to a burst of noise, your receiver sees 63% power. 63% is a perfectly valid value. Your TV can’t tell whether it received 63% because the station

wanted it to, or because of the noise burst. You’ll get a dark spot in the grey screen.

Now, let’s say your digital station is transmitting a grey screen. Let’s say “grey” is represented by the power level 43.75% – one of the eight specific levels permitted by the digital standard. Due to a burst of noise, your receiver sees 63% power. 63% is not a valid power level. Your TV knows something went wrong, and it can act accordingly. (More on this later.)

Digital television also allows “data compression.” Imagine you want to transmit a picture of the American flag: “blue,” “blue,” “blue,” “blue,” “blue,” {214 more times}; “red,” “red,” “red,” {416 more times}, “red” {new row} “blue,” “blue,” “blue,” etc... You have to transmit 640 current levels, for each of the three primary colors, for each of the 480 visible lines.

There’s a lot of redundancy in that transmission. Why not just transmit “display 220 blue dots, then 420 red ones, then repeat on the next 10 rows”? In analog TV that’s not possible, but in digital it’s very possible.

By throwing away the redundancy, less data needs to be sent to transmit a picture. Analog TV requires 6 MHz of radio spectrum to transmit a 480-line² picture. Digital TV requires less. This allows several options:

- Transmit more than 480 lines. Divide the picture into smaller “slices,” resulting in a sharper image.
- Transmit more than one 480-line picture at the same time, on the same channel.
- Give back some of the 6MHz for reuse by other services. (politically unlikely!)

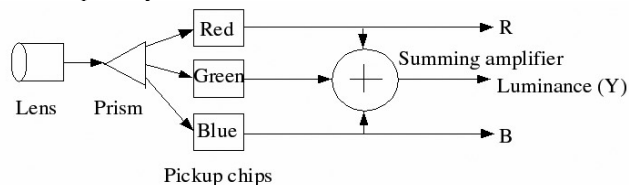
Digital TV transmits numbers representing a TV picture, rather than the picture itself. There’s nothing technical that *requires* those numbers represent a TV picture. A station could, instead, send numbers representing the music on a CD. Or a computer program. Or meteorological data. After the 9/11 attacks, the digital capabilities of WNYE-TV were used to broadcast data used in the recovery efforts.

❖ Data compression: more details

Digital television takes advantage of redundancy in the picture. It also takes advantage

of the characteristics of human vision. We see black-and-white outlines far more sharply than we see colors. TV takes advantage of this by transmitting a sharp black-and-white image, and less-well-defined color information.

A color TV camera splits the image into red, green, and blue light. Digital TV measures the amount of light of each of these three colors at each point on the screen. The three color signals are then averaged back together to yield a black-and-white, or *luminance*, signal. The red and blue signals are also taken, with every other measurement tossed out. Green isn’t transmitted at all. (Since luminance is red+green+blue, if you take luminance-red-blue, then green is what’s left. The TV receiver can take care of that subtraction.)



Red, blue, and a black-and-white “luminance” signal are transmitted in color television – both analog and digital.

We now have a collection of luminance, red, and blue measurements, or *pixels* (“picture elements”). These measurements are arranged in *macroblocks*. Macroblocks are useful since they can be predicted to move as a group. It’s likely that Brian Williams’ face will move across the screen. It’s far less likely that William’s face will morph into a Ferrari! Telling your TV to move macroblock 2389 from one place to another is far easier than completely redescribing the macroblock at a different location.

Macroblocks are then assembled into *frames*. Each frame represents one still picture. As you may know from analog TV, or the movies, showing a sequence of still pictures in rapid succession creates the illusion of a moving picture. Digital TV uses three types of frame:

- **I frame:** Each I-frame is a complete still picture in itself.
- **P frame:** A P-frame is the difference between the current still and the previous I-frame. If you were transmitting a video of someone adding the blue field to the American flag, an I-frame might show the flag with its red and white stripes; the succeeding P-frame might show the blue field and the person’s hand.
- **B frame:** A B-frame is bidirectionally-predicted by preceding and subsequent frames. Obviously, it cannot be displayed until the following I-frame is received!

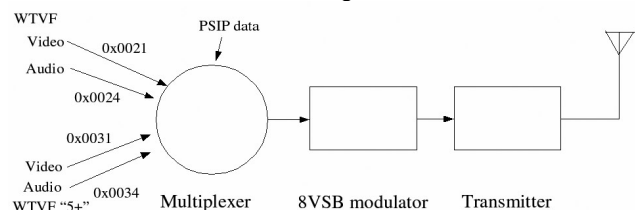


An I-frame might show the white background of the American flag, with its red stripes; a subsequent P-frame might contain only the blue field. Each further P-frame might contain one of the fifty stars.

All of the frames making up a TV picture are assembled in order into a series of numbers. This stream of data is then broken up into chunks of 188 numbers ("bytes"), creating a "packetized elementary stream," or PES. This data stream is multiplexed with audio and other data, and sent to the transmitter.

❖ A few words on audio

As with the video, digital TV audio is sent as a stream of numbers. One or more audio streams, coded in the Dolby AC-3 standard, may be transmitted. AC-3 audio offers eight different



Audio and video streams for two separate programs are multiplexed, along with "PSIP" data, before being transmitted.

audio services. It is possible to split the dialog from the music and sound effects, and transmit dialog separately in several different languages. Additional channels containing a description of the action for the visually-impaired, or emergency messages meant to override all programs, etc., are possible.

The most popular use for the additional audio capabilities is surround sound. Analog TV allows for simple two-channel stereo sound. Many digital stations transmit "5.1 surround." There's a second pair of stereo speakers behind the viewer, a center speaker directly in front of the viewer, and a "subwoofer" which plays very low-frequency sounds at a very high level. You can almost feel the program.

And again, as with the video, the stream of numbers representing the audio is assembled into a PES of 188-byte "packets." And again, this stream is multiplexed with video and other data, and sent to the transmitter.

❖ Protocol, PSIP

Remember that we've said it's possible to transmit more than one picture on the same channel, and more than one stream of audio. How does your digital TV know what to display? That's where the *Program and System Information Protocol*, or PSIP, comes in.

Each audio/video stream contains a *protocol ID*—a number that uniquely identifies that stream. WKRN-DT in Nashville carries two programs. The video for the simulcast of their analog signal uses protocol ID 21, while the audio uses ID 24. Their "Nashville WX Channel" uses protocol IDs 31 (video) and 34 (audio). If you want to watch

the analog simulcast, you tell your TV to decode the streams with protocol IDs 21 and 24; the rest are ignored.

The PSIP contains a number of *tables*. The one that's relevant here is the Virtual Channel Table, or "VCT." Information in the VCT includes:

- **Major channel number**—the channel number displayed to the viewer. This number comes from the datastream—not from the tuner—so the channel displayed may not be the same channel on which the station is actually broadcasting!
- **Minor channel number**—distinguishes between multiple program streams on the same station. WKRN's analog simulcast is minor channel 1; Nashville WX Channel is minor channel 2.
- **Short name**—a brief description of the program stream. "WKRN-HD" for minor channel 1; "WKRN-SD" for minor channel 2. This is usually shown to the viewer when they change channels.

- **Transport stream identification**—a list of the protocol IDs for the streams that make up this program. For WKRN's minor channel 1, this list would include 21 for the video and 24 for the audio.

As with audio and video, the PSIP information is assembled into 188-byte data packets, which are multi-

plexed with audio and video and then transmitted.

❖ The RF side of things

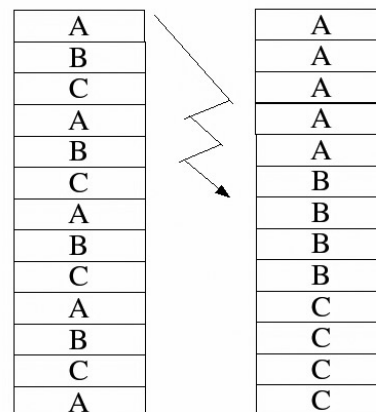
OK, we now have a pile of 188-byte data packets. You could just send them to the receiver over the Internet, but I suppose that's not what the television broadcasters had in mind!

The radio spectrum is an unfriendly place for data. Noise, interference, "ghosts," lightning, any number of things can cause the data received to be different from what was transmitted. We've already mentioned that, by using digital transmission instead of analog, we can detect that something was received incorrectly. What do we do about it?

First, a 20-byte "Forward Error Correction," or FEC, code is attached to each data packet. This is a calculated number, based on the contents of the packet. The receiver makes the same calculation. If the results match, the receiver knows the packet was received correctly. If the results don't match, in some cases the receiver can use the FEC to fix the error! When the errors are severe, they can't be repaired, but at least the receiver knows to discard the invalid data.

Next, the data packets are *interleaved* with other packets. The idea is to ensure a burst of noise and interference clobbers a small part of several packets, rather than completely destroying one packet. If a noise burst destroys seven bytes of each of ten packets, the FEC can repair the errors. If the same burst destroys 70 bytes of one packet, the packet cannot be fixed—it must be

Interleaved Non-Interleaved



Noise burst

The noise burst wipes out two each A, B, and C packets in the interleaved data signal. Error correction can fix the damage. However, the burst wipes out all five A packets in the non-interleaved signal; error correction cannot restore the lost data.

discarded.

Finally, the stream of data is sent to the transmitter. The DTV transmitter has a carrier at 310 kHz above the bottom of the channel. The strength of this carrier is controlled by the data stream. The stream is split into groups of three bits; each group can encode eight different amplitudes. The group 000 corresponds to 6.25% transmitter power; the group 111 corresponds to 93.75%; there are six other values in between.

At the receiver, as you might guess, we pull it all apart again. The receiver measures the strength of the received signal at the appropriate times, determines which of the eight permissible amplitudes the transmitter meant to send, decodes it to three bits, stuffs the stream of bits back together to create the data packets, and applies the FEC to fix or discard damaged packets. It presents the PSIP information, allowing the viewer to select which program they wish to watch, then checks the protocol IDs and processes only the packets corresponding to the program selected.

Video packets are decompressed; red and blue data subtracted from luminance to make green; and the data is sent to a digital-to-analog converter and then to the picture tube. Audio packets are split among the channels, sent to a digital-to-analog converter, and on to the speaker(s). And voilà! We have TV.

❖ Channel allocation issues

There's been a bunch of confusion over just where in the spectrum digital TV operates. The

Chicago DTV Channels

Station	Analog	Digital, interim	Digital, permanent
WBHE	2	3	11
WMAQ	5	29	29
WGN	9	19	19
WTLW	11	47	47
WYCC	20	21	21
WCUI	26	27	27
WFLD	32	31	31
WWTO	35	10	10
WISN	44	42	42
WISN	44	42	42
WPWR	50	51	51
WYIN	56	17	17
WXFL	60	59	59
WJYS	62	36	36
WGBO	66	53	38

FCC hasn't helped, by changing their mind at least twice! A secondary goal of the digital transition has been to free up spectrum for land-mobile use. The original plan was for all digital TV to be UHF in channels 14-59; channels 60-69 and 2-13 would be reassigned to land-mobile. The plan was later amended to use channels 7-51; and finally amended again to the current plan, channels 2-51⁴.

Each TV station holding a construction permit on April 3, 1997, was assigned a second channel for digital operation. All such stations were expected to begin broadcasting a digital signal by May 1st of 2003. Many stations have obtained many extensions! Originally, analog television was to be shut down at the end of 2006. Most observers never believed this deadline would be met.

Late in 2005, Congress stepped back in. An analog drop-dead date was set for February 17, 2009. On this date, all analog TV transmitters must be turned off; all over-the-air TV becomes digital.⁵ Congress' action also provides up to \$1.5 billion to subsidize digital-to-analog converters. Households will be able to apply for vouchers for up to two converters per home.

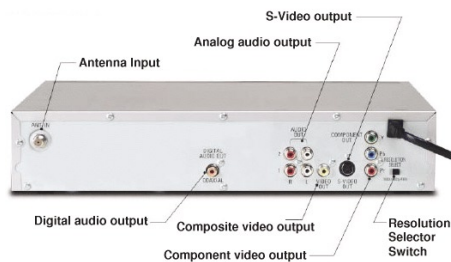
When analog TV is shut down, channels 52-69 will be reassigned for land-mobile use. Stations whose temporary digital channel is in this range will be required to move their digital operation to their current analog channel⁶. Most other stations will be allowed to choose whether to leave their digital operations on their second channels, or move them to their current analog channel. (Stations whose *analog* channel is above 51 will be required to remain on their second channel.)

A number of applications for new TV stations were on file in April 1997. Many of these have since been granted. However, these stations aren't automatically receiving a second channel for digital. Some of these stations have signed on as analog stations, and will "flash-cut" to digital operation on the same channel at some future date. Others have signed on as digital, and provided cable systems with digital-to-analog converters so they can be carried in analog form on cable. A few have petitioned the FCC to assign them a second channel for digital.

A number of stations have already "jumped the gun," closing down their analog operations early and becoming digital-only. Stations have lost leases on their analog sites; have suffered major analog transmitter failures; or have simply proven that literally *nobody* is watching their analog over-the-air signal (and thus, their transmitter is serving only to deliver their signal to cable systems, which could be served just as well by downconverting their digital signal). The company that has the post-transition rights to channel 55 has arranged for three stations whose analog signals are on that channel to move early. One station (KLEP in Newark, Arkansas) has announced it can't afford to convert to digital; KLEP has already surrendered its license to the FCC and gone off the air.

❖ Watching over-the-air DTV

On July 1st, 2003, the FCC began requiring new TVs of 36" or larger to contain a digital tuner capable of receiving over-the-air digital TV. Older TVs, even those marked "HDTV Ready," usually don't contain this tuner. A separate "set-top box" is necessary. These boxes connect to your high-



A rear view of the Sylvania 6900DTD digital TV set-top box shows the various connections available for viewing digital signals on your existing TV – or a new high-definition display.

definition TV with a VGA computer monitor connector, Y-Pb-Pr coaxial cables, or a DVI digital interface. Many can also be connected to a standard-definition TV, either through one of these interfaces, or through the standard single coaxial cable used with analog TV. I've seen set-top boxes on sale for roughly \$400 at Circuit City, and I'm sure competing stores like Best Buy also carry these devices.

(Be sure the set-top box you buy has an interface in common with your TV! And don't forget the audio; some kind of audio cables will also be necessary.)

Chances are your existing analog TV antenna will work fine for digital reception. Severe ghosts will kill digital TV, but a slightly noisy signal is no problem. If your analog reception suffers from computer noise or interference from other TV stations, going digital may well clean up your picture.

❖ DX and other tricks

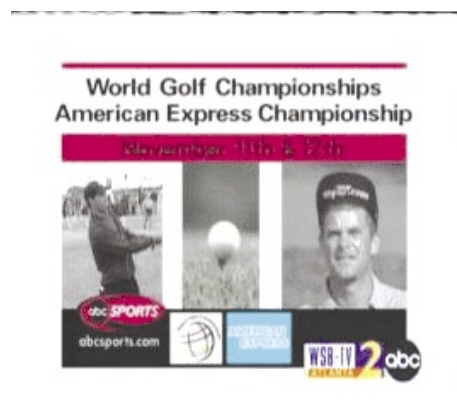
Yes, digital TV *can* be DXed. The current distance record stands at about 800 miles, for reception of eastern North Carolina stations in Louisiana, via tropospheric propagation.

The most exciting analog TV-DX is via Sporadic-E. Unfortunately, this type of propagation usually only affects channels 2-6, and so far there are very few digital stations operating on these channels. Still, digital E-skip is possible. The first DTV sporadic-E logging goes to Gerard Westerburg of Lexington, Kentucky, who received a PSIP packet from KOTA-DT channel 2, Rapid City, South Dakota via E-skip in 2003. Since then, a number of DXers have received digital audio and video via the skip mode.

Remember that the DTV signal has a carrier 310 kHz above the bottom of the channel. This can be monitored on a wideband scanner. For example, the signal of WKGB-DT, channel 48, Bowling Green, Kentucky, is too weak to decode on my DTV receiver. However, their carrier on 674.31 MHz is plainly audible on my Kenwood TH-F6 handheld. While you can't tell *which* DTV station you're hearing, you can tell that a station is present.



A Samsung 43" high-definition display. A set-top box (like the Sylvania 6900DTD) is necessary to receive digital broadcast signals on this display. Note the high-definition display is much wider than a traditional TV.



This picture looks like it was shot in the WSB-TV control room in Atlanta! - but it was actually shot by Jeff Kadet in Macomb, Illinois, 575 miles from WSB. Yes, you can DX digital TV.

❖ More resources

One could fill an entire issue of *MT* and still not fully explain the technology and regulatory activity behind digital TV. Here are a few websites where you can read more about this technology:

FCC's digital TV FAQs:
www.fcc.gov/cgb/consumerfacts/digitaltv.html

Digital TV standards:
www.atsc.org/standards.html
Program System and Information Protocol (PSIP) standards:

www.psip.org/
8VSB modulation standard:
www.8vsb.com/
WNYE-DT and 9/11:
www.skystream.com/corp/cussuccess_eas.asp

DTV receivers and tuner cards: (just a few examples)
www.tvantenna.com/products/dtv/stb/SIR-T351.html
www.tvauthority.com/HDTV-Tuners/HDTV-Tuners.asp

Digital TV DX photos: (these pages have a lot of graphics and will be SLOW to load!)
www.dxfm.com/tv_images_digital.htm

Footnotes:

1. "Synchronizing pulses," which tell your TV where on the screen to display the next burst of light, are transmitted at 100% power. Black is limited to 75% to ensure the TV can tell the difference.
2. American analog TV is usually quoted as having 525 lines, however roughly 45 of these lines are used for synchronizing signals that aren't visible to the viewer.
3. Indeed, it usually isn't. The major channel number is usually the same as the station's analog channel. In WKRN's case, it's 2, even though WKRN's digital signal is actually broadcast on channel 27.
4. Broadcasters prefer VHF channels, where less power is necessary to achieve the same coverage. At the same time, land-mobile interests prefer UHF where antennas are smaller, and there's less noise and interference.
5. The House of Representatives proposed Dec. 31, 2008 as the deadline; the Senate proposed April 7, 2009. The latter date was rumored chosen because it's the day after the NCAA basketball championships!
6. For example, WTVF-DT whose digital channel is 56; they'll be required to move to channel 5 when their analog transmitter on that channel is shut down.

The Eton S350DL

By Jim Clarke, NR2G, jimclarke@monitoringtimes.com

The Eton S350DL is a “Deluxe” version of the S350, an AM/FM/SW portable covering AM 530–1710 kHz, FM 88–108 MHz, and SW 3–28 MHz. The shortwave range is broken down into three separate bands: 3–8 MHz, 8–17 MHz, and 17–28 MHz.

According to Eton, four features distinguish the S350DL from the S350: FM-stereo via supplied headphones, an AM/SW Frequency Lock, operation with AA or D cells, and the ability to set the clock/alarm while the radio is in use.

❖ Ergonomics

At about 13” W x 7” H x 4” D, the S350DL is a little larger than most portables these days. With the industry trend toward smaller and smaller designs, Eton has chosen a larger and more military look.

Available in either red or black, half of the front panel is occupied by the speaker-grille, and the other half populated by the display and controls.

The display window is about 1” H x 3” W, providing ample space for showing signal strength, battery status, mode, and the 1/4” W x 1/2” H frequency numerals.

❖ Tuning

Here’s where things get even more atypical from today’s portables: the S350DL combines analog tuning with a digital frequency readout. Yes, you read that right, you get the advantages of analog tuning – no “chuffing” and less “system” induced noise – while enjoying the convenience of a digital frequency readout. Frequency resolution on SW and AM is in whole kHz, sorry, no tenths.

A word of caution, though; don’t expect the smooth, predictable, and relatively “rock-solid” tuning that comes from digital radios. With two concentric tuning knobs, the outer for Fast, and the inner for Slow, “fine-tuning” the radio requires a little more finesse than most of today’s listeners are used to. However, proficiency can be achieved after just a short period of practice. During my “practice,” I found the “Fast” tuning knob had a rough feel during parts of its rotation, and the

“Slow” tuning to be about twice as fast as I would like; like most things, you get used to it after a while.

I also found that changing the settings of some controls changed the frequency readout, not by much, but enough to notice.

❖ Audio

With a 4-inch speaker behind the grill, the S350DL has nice sound. Separate Bass and Treble controls allow the listener to tailor the sound to their liking. And, if that’s not enough, there is a set of RCA-sockets carrying stereo line-level audio output for those with external amplifiers or audio recorders.

As stated earlier, a set of earphones is provided as part of the package. They’re not top-of-the-line, but they are very comfortable and have very good sound quality, certainly well suited for the radio.

❖ Antennas

The S350DL has the usual ferrite bar for AM and whip for FM/SW. The telescoping whip that Eton chose is better than most, in my opinion. Its smallest section won’t bend if you look at it cross-eyed, and it just simply feels “beefier” than the norm.

If you would prefer an external antenna, there is a connector on the rear-panel for FM, as well as spring terminals for SW.

❖ Power

As noted by Eton, new for the S350DL is the ability to run the radio on either four AA or four D cells; I really like that feature. The

only downside I saw with this feature was the flap provided in the battery compartment to hold the AAs in place, which seemed to keep popping open, causing the cells to break contact, shutting off the radio.

Although Eton doesn’t include the AAs or Ds, it does provide a wall adapter that plugs into the 6 Vdc input connector on the rear panel. If you plan on plugging in your own power source, the S350DL requires less than 500 mA and uses negative-tip polarity.

❖ Auto-Backlight

Whenever the listener changes a control that has an associated display indicator, the display’s backlight automatically turns on. The backlight remains on for about 5 seconds after the last one of those controls is changed; once again, another feature I like.

❖ How Does It Play?

I took the S350DL to the bedside one evening and tuned around a little before going to sleep. Running on batteries and using the whip antenna, I found the radio to perform quite satisfactorily. While tuning the busy AM broadcast-band, and also on shortwave, the Narrow filter really worked well to reduce adjacent channel interference while leaving the audio very readable. There were plenty of shortwave stations to choose from, with many that were full-scale and full quieting. That was a pleasant surprise, as I don’t normally experience that quality of reception with portables operated in my house.

❖ Final Thoughts

A friend of mine uses a term I’d like to borrow to describe the S350DL: “a gutless wonder.” But I mean that in a complimentary way! How else do you describe a single-conversion, analog tuned, digital-readout, portable radio that actually hears well and sounds good, too?

The Eton S350DL a great radio for a beginner in the shortwave radio hobby or as an AM/FM/SW backup, and it can be found from various sources at an average price of \$150. For more information on the S350DL, visit Eton’s website at www.etoncorp.com.



MT



REVIEW

Digital Radio Equipment

By Ken Reitz, KS4ZR

If you're ready to jump on the High-Definition Radio bandwagon (see feature article on page 14), you may have to search around to find appropriate receivers and antennas, since the field is so new. Following are *MT*'s first reviews of HD equipment.

Until now manufacturers haven't exactly been flooding the market with HD Radio receivers. The most active has been Kenwood. That's not too surprising since they are also one of the early collaborators with iBiquity. Kenwood has been planning the introduction of HD Radio products for some time. In fact, many Kenwood car stereos going back to July 2003 are "HD ready," which means that, with the addition of the Kenwood KTC-HR100 digital tuner, you're ready to start listening to HD Radio. Look for the HD Radio symbol on the front of your radio or look in the owner's manual for more information.

❖ Kenwood EZ500 Mobile HD Radio

One of the more popular (and least expensive) Kenwood car radios is the EZ500. An extremely versatile car radio, it not only has AM/FM and a built-in CD player, but it's HD ready, Sirius satellite ready, will control an optional multi-disc changer, and has auxiliary inputs for whatever else you have. It has outputs for an additional optional amplifier and subwoofer for those who like their HD Radio with a little more oomph. Functions on this radio are menu driven via front panel buttons or remote control, it features an anti-theft removable faceplate, and comes with a clearly labeled wiring harness which makes hooking it up to your car less of a nightmare than it might be.

It's also easy to use the EZ500 as a home HD Radio by wiring it to a heavy duty 12 volt power supply. I used an Astron RS-12A and



Kenwood EZ500 Versatile AM/FM analog, HD Radio and satellite radio ready car radio also plays every type of CD. Comes with easy-to-use wiring harness and is easily installed in your home and run through your stereo using a separate 12v power supply. Sells typically for \$249.99 though discounts can be found. (Courtesy: Crutchfield)

the wire harness connecting the negative and positive wires to the appropriate terminals on the power supply. I combined the "accessory" wire with the red positive wire. The rest of the connections are very easy: attach the KTC-HR100 to the EZ500 via the supplied "head unit" cable; attach the AUX input pigtails to the audio output of the HR100; and attach the other two pigtails labeled "Front" to the line input on your home stereo. Finally, use an antenna adaptor to convert a 75 ohm coax fitting to Motorola auto antenna jack. That's it! Now you're ready to start enjoying HD Radio at home.

Auto installation is a little trickier, thanks to the sealed nature of most modern car dashboards. In an effort to deter thieves, it's been made very difficult for most people to do auto sound installation. It may be cheaper in the long run to take it to a local auto sound installer. On older cars with ready access to the underside of the dash installation is considerably easier. When you remove the old radio, label every wire so that you know which wire on the new harness to connect. Not all wires may be used. If you buy the radio from Crutchfield, you can get expert help on installation from their toll-free help line and you'll get the correct installation kit for your vehicle.

I ran the EZ500 at home 24/7 for two weeks straight with no problems. And the unit has continued to perform flawlessly for the last six months. The substantial heat sink on the back of the radio really does the job, and the outboard HD tuner puts out very little heat. When an HD signal is received, the EZ500 displays the station call sign and "HD1" after it. The "ps" icon on the display will be lit. If the station is multicasting, the display will show "HD2" on the second channel and the "ps" icon will flash. If the station is transmitting additional data, that data will scroll on the front panel display. Only the primary HD channel may be programmed into the memory presets. Once the primary channel is tuned, any other channels on that carrier may be tuned.

The radio performs very well with reception of analog stations – at least equal to my Kenwood home tuner/amp. The difference, of course, is when an HD Radio signal is tuned. At first the analog signal is heard and seconds

later, once the HD signal is sensed, it switches to HD mode.

This slight delay is actually useful in being able to compare analog and digital. The difference is stunning! All traces of FM broadcast, the slight background hiss and other audio artifacts, disappear. The audio level decreases and the dynamic range of the music seems to expand in your ears. Moving bass, clear highs and full mid-range audio makes you do a double take to see if there's a CD in the player.

Public radio stations programming classical, jazz and folk music tend to have the cleanest sound in HD. I noticed less dramatic difference listening to commercial HD-FM on popular music stations, where the audio is often overdriven. Hearing the commercials really breaks the HD spell.

Because car antennas are omni-directional and have considerably less gain and side lobe rejection than a beam antenna, you can expect reception in the vehicle to be less satisfactory than you can get at home. If you live in or near a city such as Chicago with a dozen or more HD stations operating, you'll have many formats from which to choose and mobile HD Radio will be great. The rest of us will have to wait until our local stations can bring HD signals to us.

On the AM band listeners will have the same experience with HD as they now have with analog AM stereo. If you live in a city you'll probably hear a difference, but only during the day.

❖ Winegard 10 Element Yagi

It's not been easy to find a good, relatively inexpensive FM band DX antenna. But, there is one: Winegard's HD6065P. This is a serious FM DX antenna for music lovers hoping to



Winegard HD6065P deep fringe 10 element Yagi FM antenna. Use with Winegard mast-mounted pre-amp to lock distant HD Radio signals out to 60 miles and analog FM signals to 100 miles and more. (Courtesy: Winegard)

increase their choice of programming with the advent of HD Radio or analog FM DXers eager to peer over the line-of-sight horizon. This well built, 10 element Yagi FM antenna is on a 10-1/2 foot long boom with the longest reflector element 5-3/4 feet long. There is a support boom attached to the main boom to maintain rigidity once it's mounted on the mast. It has a built-in balun with a 75 ohm cable fitting at the feed point.

According to Winegard's spec sheet, it's a slightly better performer in the upper part of the FM band. But, even at the bottom of the band (the so-called Public Radio band), it has 9.4 dB gain over a reference dipole at 88 MHz, a beamwidth of 59°, and a front to back ratio of 20 dB. This antenna has a shipping weight of 10 pounds and comes split to make UPS shipping possible. Assembly is very easy with excellent instructions. Winegard recommends their own AP series mast-mounted pre-amp to boost reception though you can use any VHF-TV pre-amp.

Unless you're interested in receiving from only one direction, you'll have best DX results using a rotator. Radio Shack has priced itself out of the market with its rotator selling for \$80. I found one for \$52, including shipping, from X10.com (www.x10.com). Reception will be dramatically improved with the addition of a mast-mounted pre-amplifier. Since you're only concerned with amplifying the VHF band, I recommend the Winegard AP3800 which advertises an increase of 29 dB gain at VHF frequencies. I found this product at www.summitsource.com/antennas-accessories-preamplifiers-c-47_66.html?ref=4 for \$49.95.

The MSRP on this antenna is \$89.99 but it's deeply discounted at Solid Signal to \$73.99. For ordering information go to: www.solidsignal.com/prod_display.asp?CAT=&PROD=HD6065P

❖ Winegard SharpShooter TV-FM HD Antenna

Last June Winegard released its SharpShooter SS3000 antenna, an amplified, indoor, directional antenna designed for VHF and UHF reception. Its unique design is particularly useful for city residents dealing with multi-path distortion caused by signals bouncing off large buildings and arriving at the receiver at slightly different times. Multi-path shows up in analog TV signals as "ghosts" and wreaks havoc on the FM band, making reception nearly impossible even for local stations. This antenna does the trick. It successfully eliminates multi-path and provides a stable, clean signal.

I used this antenna with the Kenwood HD Radio and found it would not lock up HD signals from 30 miles away. That's okay because it's not a DX antenna and I hadn't expected that it would. So, I thought I would give it the UHF-TV test. In this location there



Made in U.S.A. Patent Pending

Winegard SharpShooter SS3000 HD Radio and DTV amplified set top antenna. Combats multi-path distortion on digital TV and HD Radio reception for city dwellers. (Courtesy: Winegard)

is a very powerful UHF-TV station whose signal ricochets off the hills and mountains and is notorious for ghosting. With any other indoor antenna, the signal, while strong, is unwatchable because of the multi-path distortion. This antenna sorted it out and delivered a nearly studio quality picture. I was amazed.

The reason this is important is that on the FM and UHF-TV bands (almost all digital TV transmissions are UHF) multi-path distortion makes digital reception impossible. The digital receiver is confused by the data streams coming in at different times and, while the signal strength meter will indicate a strong signal, there will be no picture or sound. City dwellers have long suffered from multi-path, and in the coming digital FM and TV age, clean reception will be critical. The SharpShooter SS3000 may be the solution to this problem.

This antenna is so new to the market that I had trouble finding it. When I did, I found it at prices ranging from \$73 to \$130. For the best price do a "google" search or go to www.bizrate.com and see what you can find.

Monitoring Times is in line to review several other HD radios as they become available, so watch for more reviews by Ken Reitz in coming months!

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SysLabs' RadioControl: Part 2

Last month we began looking at a radio control and database program from SysLabs aptly named RadioControl. This program comes in three versions, which range in price from \$48 to \$252, and a free trial version. See www.radiocntl.com/english/index.html for details and costs of the three versions.

We were in the middle of trying the Professional version (\$252) when we ended last month (see last month's column for basic details of RadioControl). Let's continue exploring more of RadioControl's features.

Easy Searching

Three methods of frequency searches are available from the Front Panel. The simplest search starts from the current frequency and scans up or down in frequency. The second method searches between two user-defined frequencies. The third searches one megahertz of spectrum. Control of the searches can be accomplished either by the menu under the "Advanced" button or the keyboard's "F" keys.

An important feature of RadioControl is that searching can be performed in the background so you can continue working with the program while the search is in progress.

What about that Database?

When loaded using the "File" menu, the database is displayed in the bottom half of RadioControl's screen, Figure 1. The program includes a few example frequency files. Of course, a new database file can also be created using the "File" menu.

Each database entry contains twenty parameters that can be selected by the user. These parameters include frequency, label (description), step, mode, ATT, AFC, BFO, AGC, CTCSS, DTMF, and ten additional fields. In order to produce a clearer image for this publication, the PC's screen was set to a lower than recommended resolution. Therefore, Figure 1 does not display all the parameter fields. Some fields use a drop down list instead of a simple text box, allowing easy data entry and consistent terminology. However, the values of the drop down lists are user customizable.

Selecting the "Find" function, a data lookup can be performed using a combination of the above twenty parameters. Then any matching database entry is displayed as a highlighted row.

Entry View

Each entry can also be displayed in a more detailed view, which the program's very well executed Help file calls the "Form" view. Figure 2 displays the same table entry that is highlighted in Figure 1 in the Form view. Figure 2 also displays the "Notes" box for this BBC entry. Each database entry has the capability of having a "Notes" box in which free style text can be stored.

Frequency IDing

In my opinion, one of the sweetest features of Radio Control is the Frequency Identification. This takes the tuned frequency and automatically performs a search of your frequency database. If a frequency match is found, the station's name (BBC World Service), is displayed above the large frequency display. See Figure 1.

In order for auto-id to operate, a Frequency Identification Database must be selected or a new one created. Then you must tell RadioControl where on your system the file is located. This is done by specifying the path and file name in the "General" tab of the "Options" sub-menu in the "Extras" menu. (It sounds more complicated than it really is.)

The Frequency Identification retrieves and displays the Text (in this case BBC World Service) in the "Display Text" box of the Record whose frequency matches the "found" signal. The "found" frequencies can also be displayed in the Spectrum View and then zoomed in to display all the record's details.

Frequency Search

The Frequency Search is useful in finding active frequencies. To perform such a search, you must create a new RadioControl Frequency Search document via the "File" menu and specify the radio that will be used for the search, among other search parameters.

The Table View of the document lists all "found" frequencies and uses the Frequency Identification feature (described above) to get a detailed description for each frequency. The "found" frequencies can also be displayed in the Spectrum View and then zoomed in to display all the details.

Since RadioControl's database is an MS Access 2.0 database, importing and exporting of data from/to other MS Windows applications is easily performed. Sharing data with files from HTML, text, VisualRadio, Radio Manager 4.X and SCAN-control 2.x files are possible. Another possibility is to export the database to a Memory File.

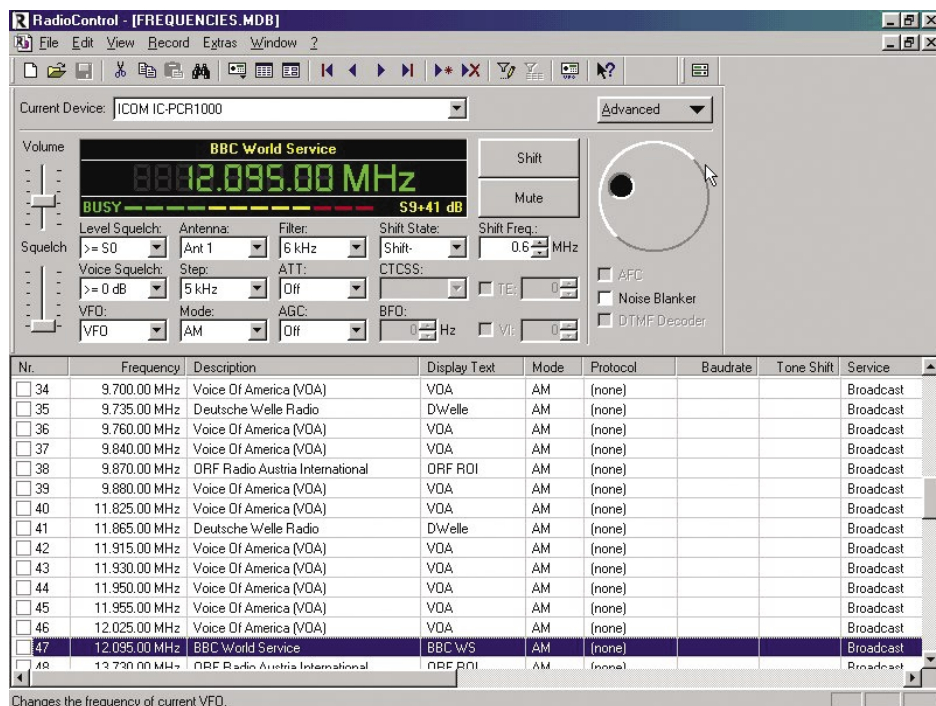


Figure 1 - Automatic Frequency IDing. The matching station's name, BBC World Service, is displayed above the frequency. The Form view, below, shows the corresponding database entry as a highlighted row.

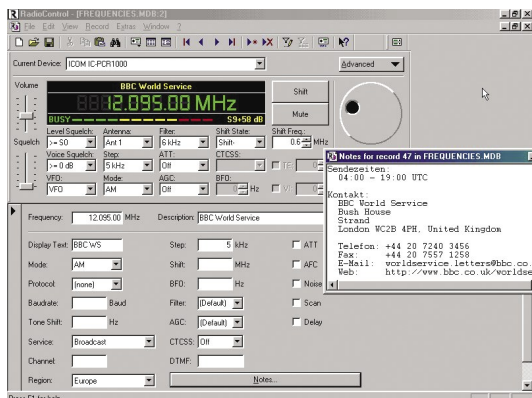


Figure 2 - The Entry View displaying the same table entry that is highlighted in Form view shown in Figure 1.

The Memory File

The Memory File stores frequencies used for copying into the memory resident in the radio. The source of this data can either be selected from entries in the Frequency Database file or manually entered by the user. Then the resulting file may be uploaded to the radio's memory or exported to other applications.

The Memory File has another important and impressive function. It can be used to scan an unlimited number of selected entries/channels. The scanner runs *in the background* and collects data, including hit count and date/time of last hit.

Controlling Four Radios

If you are using RadioControl 1.0 Professional Edition with Service Pack 1, a RadioControl Plug-in, 4-Devices Monitor, is available at additional cost (see website for details). The installation of this option is interesting in that the dongle is also updated to allow use of the 4-Device option. This shows that the dongle is a sophisticated active device with on-board memory. No simple resistor network in this dongle!

The 4-Devices Monitor allows monitoring and control of up to four receivers and/or transceivers. The current state of each receiver/transceiver is displayed in a bank format. See Figure 3.

Choosing the radios to be controlled is done from the "Extras" menu. Go to the "Plug-ins" sub-menu under the "Extras" menu and select "Configure" and then "4-Devices Monitor." Now select your radios and you're ready to control a bank of four radios simultaneously. See Figure 3 taken from the RadioControl website.

After choosing the radios, go back to the

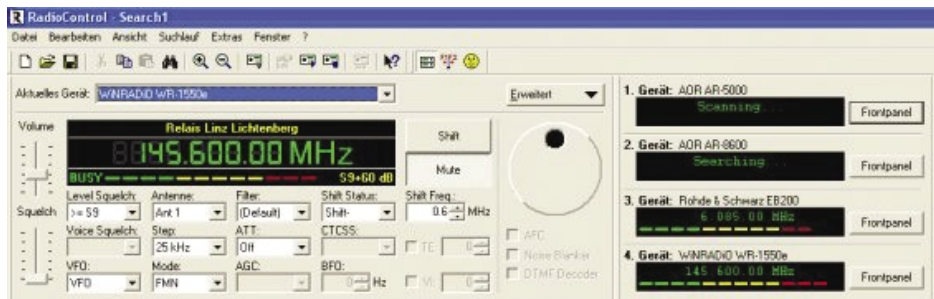


Figure 3 - The 4-Devices Monitor controlling four radios seen on right. One radio's front panel is selected and opened at left (from the RadioControl website).

"Plug-ins" sub-menu under the "Extras" menus. Clicking the "4-Devices Monitor" does the trick. All radios are displayed in the bank at the right side of Figure 3. However, each one of the radios can also be displayed as a detailed front panel as seen in the left side of Figure 3.

Do You Have The Hardware?

I tried the 4-Devices Monitor using an ICOM serial to CI-V interface. Since each ICOM radio uses a different address, a number of radios can sit on the same serial port, yet be independently controlled. That's the theory. In fact for some programs I use it is the reality.

However, in this one serial port configuration I could not get RadioControl to operate more than one radio in the 4-Devices Monitor mode. "Initialization Error" kept coming up for the other radios. Perhaps I made a mistake or RadioControl requires a dedicated serial port for each radio. In these days of one stock serial port per PC, a multi-serial port accessory card would be necessary to use the 4-Devices Monitor function. These cards are not expensive, but is another cost and bother for the non-professional user.

So, What Do I Think?

RadioControl Professional version operates exactly as advertised. It is very well behaved and did not throw us any surprises. I was impressed with RadioControl's many unique features which will be extremely useful to both SWLers and Hams alike.

I believe the graphical representation of the radios, even those which had unique drivers written for them, could benefit from more customized graphics. Currently most of the radios look exactly alike, except for shaded inoperative areas. The "radio" experience would be more satisfying if the screen looked similar to the radio(s) the program was controlling. This would be a real added plus for the high priced Professional version.

Baby You Can Drive My Radio

The device driver for the IC-PCR1000 has recently been totally rewritten allowing much faster communication. It has digital Automatic Frequency Control, very useful for signals varying in frequency, such as Doppler-shifted earth orbit satellites. It also supports the IC-PCR100 radio as well.

The current IC-R7000 driver, version 1.0.3,

initially would not work with my receiver until I first keyed in a frequency from the keyboard on the radio and pressed enter. After that it'd work great until I restarted the program. Not a big deal, if you remember the quirk.

Radio drivers are being added and refined, so a bit of patience may be required for a particular radio.

Picky, Picky

Unlike other programs, RadioControl does not reflect any manually selected functions at the radio. For example, if you change frequency using the tuning knob on the radio, RadioControl does not recognize that the frequency has been altered. This one-way communications, from the PC to the radio and not from the radio to the PC, may be a result of the many radios (both receivers and transceivers) of different manufacturers that RadioControl attempts to accommodate. However, it is a feature that I miss.

Summary

If you are a Ham or SWLer looking for a comprehensive radio/transceiver control and database program you **should** download the free Trial version of RadioControl at www.radioctl.com/english/index.html and give it a try. You may find one of the versions is just what you are looking for.

❖ 45 Million Miles - That's DX!

RFSpace's SDR-14 software definable radio, as reviewed in this column a number of times, made the news recently under the banner headline at Slashdot, "Ham Hears Mars Orbiter 45 Million Miles From Earth." The story goes on to tell how "... Paul J. Marsh (M0EYT) has managed to detect and receive NASA's Mars Reconnaissance Orbiter on X band at a staggering range of 45 million miles from Earth using a home made receiver setup and a RFSpace SDR-14 software radio..."

45 million miles. Now that's DX that no other commercially available radio, that I know of, can claim!

If you would like to find out more about this amazing project go to <http://science Slashdot.org/science/05/12/19/041205.shtml?tid=160&tid=14> and www.uhf-satcom.com/mro/ for all the details. Congratulations to all those involved with this landmark project and RFSpace, www.rfspace.com/sdr14.html for being picked as a critical component.

Till next time when we will continue our interesting journey through the 21st century.

Daniel Sampson's
PRIME TIME SHORTWAVE
<http://www.primetimeshortwave.com>

Your guide for up-to-date English shortwave schedules sorted by time, country and frequency plus a DX media program guide and newsletter

What's NEW

Tell them you saw it in Monitoring Times

WiNRADiO Marine Receiver

With marine navigation and communications becoming increasingly dependent on digital technology, ship owners have had to invest in new radio equipment. A cost-effective solution for the yacht owner is the software-defined WiNRADiO WR-G33EM HF Marine Receiver – a computer-interfaced high performance digital radio receiver.

The WR-G33EM covers a frequency range from 9 kHz to 30 MHz



and contains a number of marine-specific decoding facilities including HF Fax, NAVTEX, DSC and TELEX, as well as classic AM, SSB and CW modes, all with automatic scheduling and recording. All decoding functions are integrated within the elegant and easy-to-use graphical user interface. Switching from AM or SSB modulations to receiving DSC, HF Fax, NAVTEX or TELEX messages is just one mouse click away.

The WR-G33EM receiver is extremely sensitive and optimized to work with the relatively short antennas typically found in a marine environment, yet features a respectable dynamic range, making the receiver resistant to strong signal overload.

Features offered by the WR-G33EM receiver not generally found on a conventional marine receiver include a real-time spectrum analyzer with continuously variable bandwidth, graphical notch filter and IF recording.

The WR-G33EM will be available around February/March 2006. For more information and pricing, visit www.winradio.com/marine

GPS-Enabled Beartracker Scanner

At the Consumer Electronics Show (CES) in January, Uniden introduced a new mobile scanner, the Bearcat® BCT15. This model extends Uniden's line of GPS-enabled

scanners that automatically select nearby radio systems for scanning. The BCT15 also offers Uniden's unique BearTracker system, which alerts mobile users to public safety activity in their area as well as Close Call RF Capture Technology that automatically locks onto nearby signals with no programming necessary.

The GPS-enabled feature offered by the BCT15 provides automatic system selection, which permits the scanner to turn system reception on or off depending on the user's location, and allows the user to customize the scanner display to show location-based information. In addition, when a GPS unit (not included) is connected to the BCT15, the scanner will send alerts at areas such as dangerous intersections, school zones, or general points of interest.

The Bearcat® BCT15 also offers Close Call™ RF Capture Technology, Dynamic Memory Management, Fire Tone-Out, and Multi-site programming, as well as 2,500 channels and a frequency range of 25 MHz to 1.3 GHz (excluding cellular and UHF TV).

This new model is slated to hit retail shelves in summer 2006 and carries a MSRP of \$379.99. An extended list of features will be available on the Uniden America Corp. website (www.uniden.com). Watch *MT* for an in depth review.

Coaxial Lightning Protector

Utilizing a tuned circuit, the EFM Communications Model EFM-30-512 coaxial lightning protector will pass RF frequencies from 30 to 512 MHz, while lightning frequencies (DC to 1 MHz) are attenuated and passed to ground. Unlike gas tube protectors, says the manufacturer, the EFM Series will attenuate and divert all lightning surge voltages to ground, regardless of voltage level, and continuously drains static off the antenna system; plus there is NO gas tube to fail or replace.



The EFM lightning protector presents a DC short between the center pin and shield on the antenna port, and a DC open between the center pins of the antenna and equipment ports. It is designed to be used in systems where there is no DC voltage on the coax to power tower-mounted electronics.

The EFM-30-512 is appropriate for VHF/UHF stations and repeaters. Two other models are also available: the EFM-1-30 for HF Point-to-Point Communications and EFM-806-960 for UHF Trunked Systems. All are \$59 from EFM Communications (18543 Devonshire Street, Northridge, CA 91324); www.efmcommunications.com; (818) 831-0515.

Discover DXing!

Are you looking for a book to guide you through the mine fields of AM, FM and TV? Author John Zondlo has recently released his third edition of *Discover DXing!* This popular 96-page soft-bound book will guide you in a non-technical, conversational style to introduce you to the basics of AM, FM and TV DXing.

Topics include TV-FM DX – *How It Happens* and *What You Can Hear* – followed by an understandable introduction on propagation and equipment suggestions. If medium wave is your forte, here's a guide to getting started, including station lists, "Best Bet for Hearing All States," "Foreign DXing," receivers and antennas.

In addition to understanding the art of DXing, the informative chapters on "Record Keeping," "Verifications," and "Maintenance" will help you keep your logs and QSLs in order.

If hobby clubs interest you, check out the "DX Clubs" that specialize in AM/FM and TV DXing.

As an introduction for beginners or an aid to intermediate hobbyists wishing to expand their listening techniques, this third edition of *Discover DXing!* is a good and informative guide.

Discover DXing! (Order # 0009) is available for \$6.95 from Universal Radio Inc, www.universal-radio.com, at 1-800-431-3939,

or write to: 6830 Americana Pkwy., Reynoldsburg, OH 43068-4113 USA.

– Gayle Van Horn

Monitoring Monthly

A new hobby magazine is on the shelves in the UK – *Monitoring Monthly* made its first appearance in February 2006 in a bonus 116-page issue which incorporated many articles written for an unpublished January issue. The line-up is similar to the wide spectrum coverage of *Monitoring Times* and includes some names familiar to our readers, such as Lawrence Harris (weather satellites) and Jacques d'Avignon (propagation charts).

Other regular columns cover scanning, civil and military aviation, TV DX, data modes, satellite news feeds, pirate, clandestine and numbers broadcasts, utilities, and broadcasting (as broken down into long, medium, shortwave, and American, European and Australian broadcasting). Also included are equipment reviews, projects, and a list of radio clubs.

Now that we've piqued your interest, you should know that the magazine is an effort of Nice One Publishing, editor Kevin Nice, and many former columnists from the well-known British *Short Wave Magazine*, previously published by PW Publishing. PW recently combined *SWM* and *Radio Active* into a new magazine entitled *Radiouser*, edited by Elaine Richards. Though we have not seen a copy, *Radiouser's* coverage appears similar to *MM*, minus the satellite and propagation reports, and perhaps with slightly less shortwave broadcast coverage.

To learn more about both magazines, the contents of current issues, and subscription information, go to www.monitoringmonthly.co.uk and www.radiouser.co.uk

Books and Equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC, 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com.



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- _ Calibrated LCD signal strength meter
- _ Power Source: 4 "D" Batteries (not included); AC Adapter (included)
- _ Dimensions: 13"W x 7-1/2"H x 2-1/2"D
- _ Weight: 4 lb 3 oz.

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- _ Internally recharges Ni-MH batteries
- _ Station name input
- _ Dimensions: 6-5/8"W x 4-1/8"H x 1-1/8"D
- _ Weight: 12.2 oz.

Features are subject to change



E10 \$130*

AM/FM/Shortwave Radio

Intelligence meets performance in the E10. With 550 programmable memories, manual and auto scan, precision tuning and alarm clock features, the E10 provides the sophisticated tools for listening to news, sports, and music from around the world. The E10 even allows internal recharging of its Ni-MH batteries (charger and batteries included). With excellent AM, FM, and Shortwave reception, intermediate frequency shift and shortwave antenna trimmer—the E10 gives you the performance you want with the digital ease you deserve.

Features

- _ Shortwave range of 1711 – 29,999 KHz
- _ 550 programmable memories with memory page customization
- _ Manual and auto scan, direct keypad frequency entry, ATS
- _ Clock with alarm, sleep timer, and snooze functions
- _ Earphones
- _ Supplementary wire antenna
- _ Power Source: 4 AA Batteries (included) or AC Adapter/Charger (included)
- _ Dimensions: 7-1/2"W x 4-1/2"H x 1-1/2"D
- _ Weight: 1 lb. 1oz.



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Features

- _ Shortwave range of 1711 – 29,999 KHz
- _ 200 programmable memories
- _ Memory page customization
- _ Manual and auto scan, direct keypad frequency entry
- _ Earphones
- _ Power Source: 2 AA Batteries (included) or AC Adapter (not included)
- _ Dimensions: 5"W x 3"H x 1-1/4"D
- _ Weight: 7 oz.



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IC-R3 • 500 kHz - 2.45 GHz* • AM, FM, WFM, AM-TV, FM-TV • 450 Alphanumeric Memories • CTCSS with Tone Scan • 4 Level Attenuator • Antenna with BNC Connector • 2" Color TFT Display with Video and Audio Output Jacks • Lithium Ion Power

IC-R5 • 150 kHz - 1.3 GHz* • AM, FM, WFM • 1250 Alphanumeric Memories • CTCSS & DTCSS Decode • Weather Alert • Dynamic Memory Scan • Icom's Hot 100 Preprogrammed TV & Shortwave Channels • Weather Resistant • AA Ni-Cds & Charger

IC-R20 • 150 kHz - 3.3 GHz* • AM, FM, WFM, USB, LSB, CW • 1250 Alphanumeric Memories • CTCSS & DTCSS Decode • Dual Watch • Audio Recorder • Weather Alert • Dynamic Memory Scan • Icom's Hot 100 Preprogrammed TV & Shortwave Channels • Lithium Ion Power

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